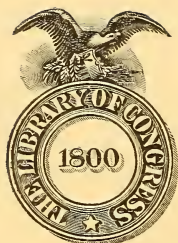


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LACE INDUSTRY IN ENGLAND AND FRANCE

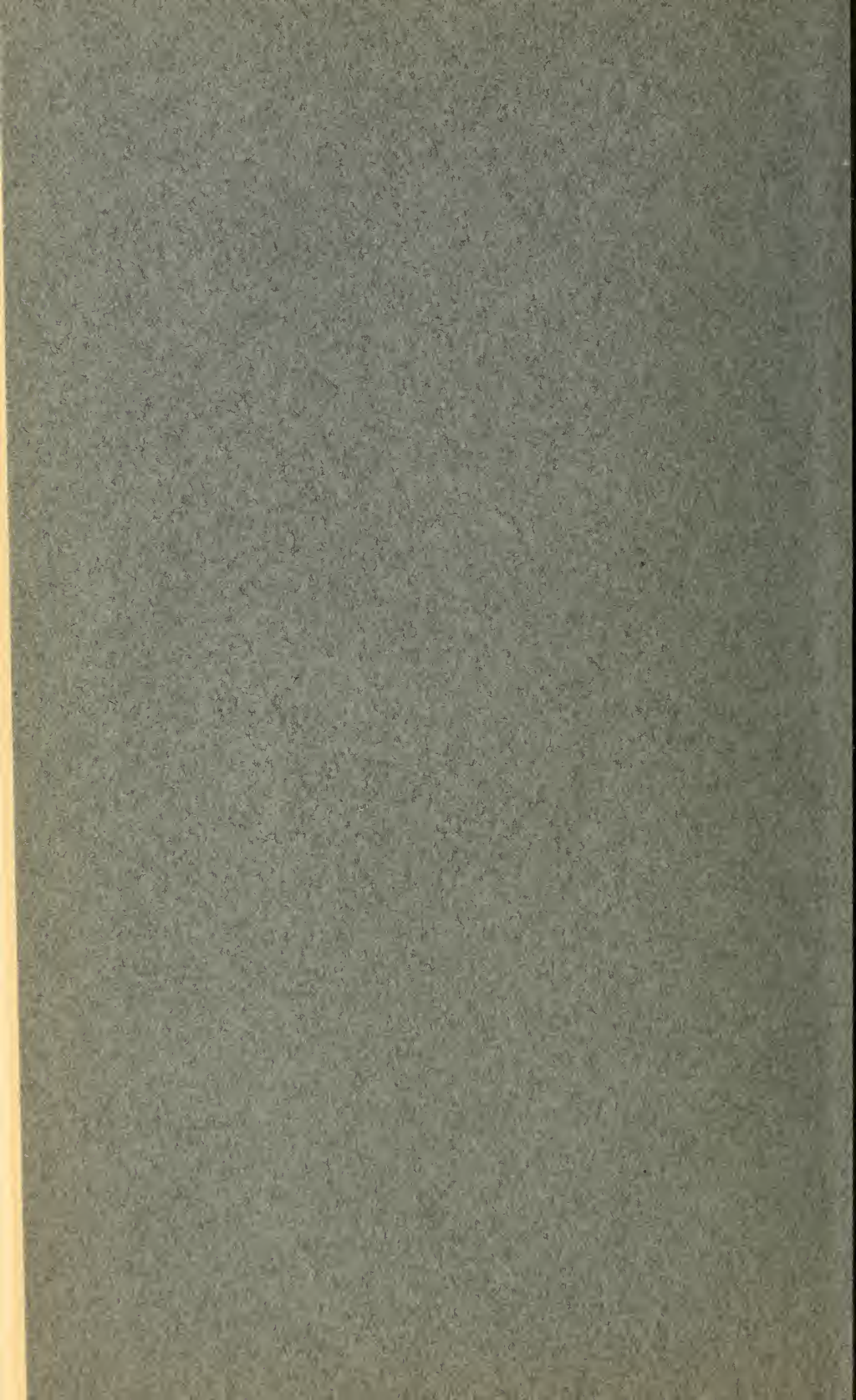
By

W. A. GRAHAM CLARK

Special Agent of the Department of Commerce and Labor



WASHINGTON
GOVERNMENT PRINTING OFFICE
1909



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LETTER OF SUBMITTAL.

NOTTINGHAM, ENGLAND, *August 14, 1908.*

SIR: I have the honor to submit herewith a brief sketch of some phases of the fancy-lace industry of Nottingham and Calais as found from my recent investigations at these points.

The Calais section, in France, and the Nottingham section, in England, supply the bulk of the fancy lace and net requirements of the world. St. Gall, in Switzerland, is the embroidery center of the world, as is Plauen, in Saxony, for embroidered lace, and Barmen, in the Rhine Province, for Barmen laces, but none of these products is lace in the correct sense of the word, the first two using the embroidery machine and the latter the braiding machine.

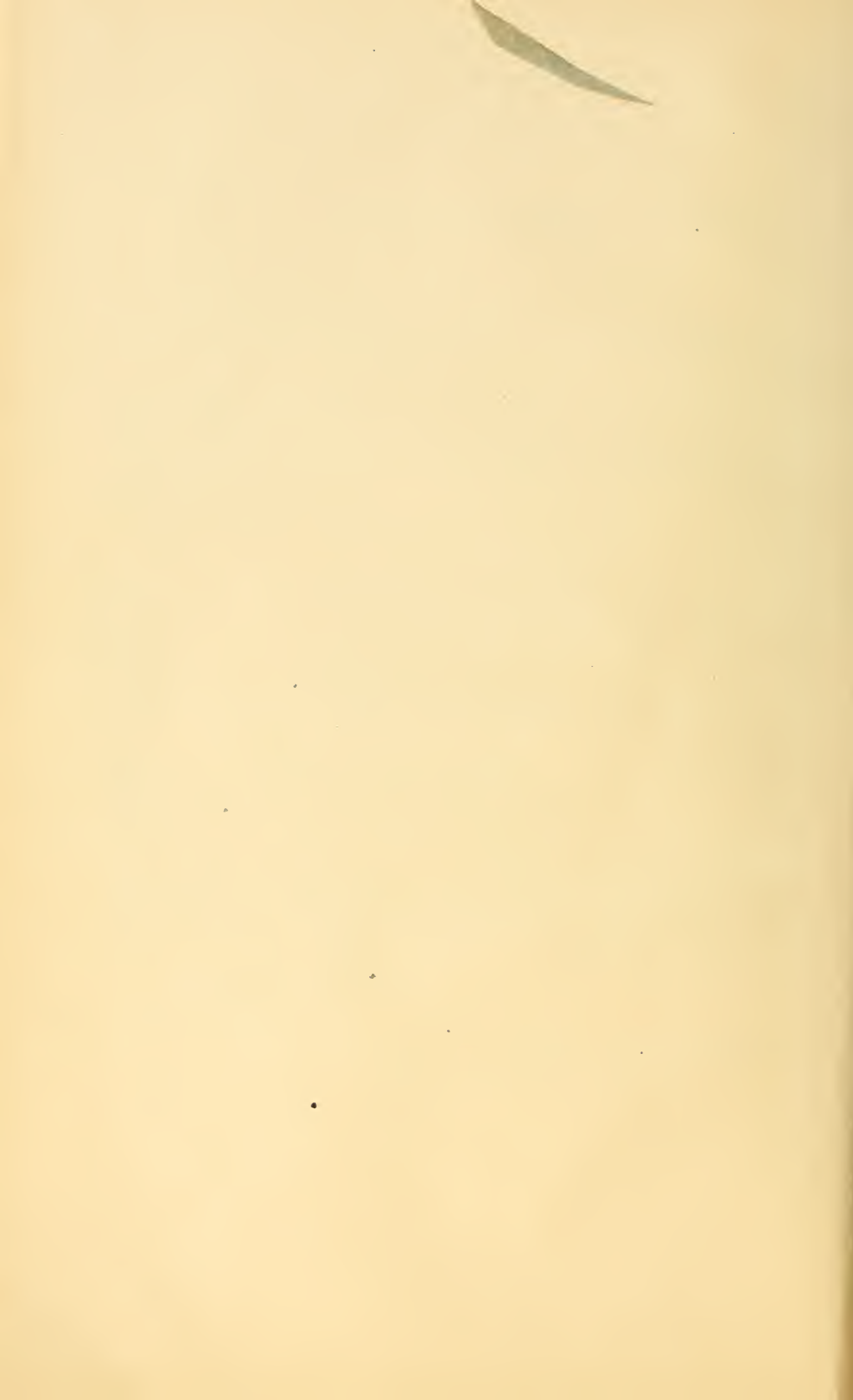
Over half of the American imports of cotton goods—\$41,443,363 out of \$79,524,943 in calendar year 1907—consisted of laces and embroideries. Of this great amount the United Kingdom supplied \$7,256,131 and France \$12,260,861, which were in both cases nearly entirely lace, as the embroideries were supplied by Switzerland and Germany. The import of lace alone, therefore, is fully twenty million dollars a year.

The French and English find their best lace markets in the United States. By calling attention to this fact and showing something of the conditions of manufacture in Europe, I trust that this report may assist in stimulating efforts that are now being made to initiate this industry in America and that the American manufacturer may finally gain as large or larger percentage of the fancy-lace trade as he has already of the smaller lace-curtain branch.

Very respectfully,

W. A. GRAHAM CLARK,
Special Agent.

To Hon. OSCAR S. STRAUS,
Secretary of Commerce and Labor.



LACE MAKING AT NOTTINGHAM

EXTENT OF INDUSTRY.

UNITED STATES TAKES NEARLY ONE-HALF THE OUTPUT—PRESENT METHODS OF MANUFACTURE.

Nottingham, in the Midlands, is the center of the lace and hosiery industries of Great Britain, though much of the lace finished and sold here is manufactured at smaller outside centers in England or in the border towns of Scotland. This is especially true of the curtain trade, of which Nottingham has only a small proportion of the total factories, but does most of the dyeing, starching, and finishing work.

The lace industry in and around Nottingham is divided into three branches—the Levers fancy lace, the plain net, and the lace-curtain branches—each with a standard wage schedule of its own. The fancy-lace branch of the trade is by far the largest, followed by the plain net, and then the curtain.

The leading manufacturers estimate the total output of lace of all kinds from Nottingham at 4,000,000 to 5,000,000 pounds, worth about \$20,000,000 to \$25,000,000 annually. The government statistics showing that Great Britain exports this much annually would tend to indicate that much lace is made in the scattered sections outside of this center.

EXTENSIVE AMERICAN PURCHASES.

The cotton and silk lace and net and articles made thereof exported by Great Britain in 1907 amounted to \$35,474,206, and of this amount \$15,396,911 worth was sent to the United States alone. Over a third of the total lace exported by Great Britain was imported and then reexported, and over half the lace bought by the United States from Great Britain every year is of Continental origin. This is shown by British official figures covering exports for 1907, as follows:

Description.	To all countries.	To United States.
British made cotton lace and patent net.....	\$23,709,048	\$6,837,725
British made silk lace and articles thereof.....	670,589	132,826
Foreign made cotton lace and articles thereof.....	8,924,241	6,483,502
Foreign made silk lace and articles thereof.....	2,170,328	1,942,858
Total.....	35,474,206	15,396,911

Great Britain imported in 1907, \$17,207,622 worth of cotton laces and \$1,361,242 worth of silk laces.

It is seen that the United States is Great Britain's most important market for lace and its manufactures, for of British made lace exported the United States absorbed nearly 30 per cent and of the foreign made lace reexported it took over 75 per cent. Of the British made laces the bulk is shipped from Nottingham. For the fiscal year ending June 30, 1908, the American consulate at Nottingham records the lace shipments of all kinds to the United States as amounting to \$5,423,902, against \$6,258,758 for the preceding fiscal year.

Next to the United States the best customers for British made laces are Germany, New Zealand, Australia, France, Belgium, Brazil, Argentina, and Mexico.

While the lace trade of Nottingham is prosperous, it does not seem to be advancing as fast as the Calais section in the manufacture of fancy laces, though it still holds its own in other lines. These are the two main lace-making centers of the world. Though Switzerland leads in embroideries, and Germany in etched laces and Barmen laces, none of these articles are really lace, as they are not made on lace machines but on embroidery and braiding machines. The methods and machinery used in the English and French lace making are almost identical and each has borrowed part of the trade vocabulary of the other.

WORKING PERIODS AND FACTORY BUILDINGS.

At the present time (October, 1908) the lace trade is in a depressed condition due to the financial condition of the world, and factories at Nottingham and on the Continent are running short time, and some have even stopped, but this depression can not reasonably last much longer. Ordinarily the factories run night and day, that is up to midnight. Two lace makers, twist hands as they are usually called, are employed alternately on each machine and they divide the weekly wage made between them. One shift works from 4 to 9 a. m. and from 2 to 7 p. m. and the other from 9 to 2 and from 7 to 12. Each alternate week the shifts are changed, so that the one that begins at 4 o'clock one week begins at 9 o'clock the next. On Saturdays the mill stops at 2 o'clock. In some factories the shifts, instead of working five-hour periods, work alternately four and six hour periods, and the factories stop at 1 o'clock on Saturday.

The lace factories of Nottingham are usually three or four stories high, and must be built very strongly to sustain the weight of the heavy machines, as ordinary lace machines weigh about 12 tons each and are closely spaced. The factories are usually in rectangular form, but some that have grown up gradually are in all shapes with additions here and there. The new factories are up-to-date, though the old factories are not very economically or conveniently arranged. The rooms are usually well lighted, are 12 to 14 feet high, and of a width to set in one machine endwise with an alleyway down the side.

There are a good many small machine users and to accommodate these outside capitalists have erected large factory buildings and equipped them with power and light. In such cases there are a good many machine owners in one building or even in one room. They

usually pay according to the "standing" required for one machine, the ordinary 32 by 7 foot standing rent being from 5s. 6d. to 7s. (\$1.34 to \$1.70) a week. Besides the machine owners, such factory buildings usually contain other men who make a specialty of preparing the yarn in the forms required for the machines.

MACHINE VARIATIONS AND IMPROVEMENTS.

In addition to the three main types of Levers fancy, plain net, and curtain machines, there are in the Nottingham district variations of these such as the warp-lace machine for making edgings, purlings, etc.

At Calais the fancy-lace machine is practically the only one used as the net or "tulle" is made mainly at Caudry and Lille. The French curtain trade is comparatively small.

At Nottingham also the fancy-lace machine is by far the most important, though there is a very large number of net machines employed. The curtains are mainly made elsewhere and finished here. At Nottingham the factories now tend to leave the town, as they can get cheaper labor with less restrictions outside. Thus places like Long Eaton, 7 miles away, which have the newer factories with newer machines and cheaper labor, can frequently do work cheaper and better than Nottingham itself. In the same way, in France, Caudry tends to take away much of the trade of Calais.

The present fancy-lace machine is due to the French. Though the bobbin net lace machine itself was invented in England and smuggled over to France, it was not until 1834 when the Jacquard was invented and adapted to the use of this machine in France that the modern fancy lace making by machinery really came into existence. Since then it has been a race between the English and the French inventors as to which could make the most new inventions and adaptations to originate new methods and laces. The French seemed to be in the lead till recently when the English again went ahead by inventing minor improvements and embodying them in a machine 260 inches long, whereas the largest in the world heretofore has been 230 inches.

DISSEMINATION OF METHODS—FANCY-LACE MACHINES.

The English are refusing orders from abroad for some of their new improvements, as does one of the largest French manufacturers who refuses to sell any of his machines to the United States. Such methods can not be successful in the long run. Less than 100 years ago the English made heroic efforts to prevent other nations from using their machines, and in the case of lace machines any exporter was punished with heavy fines and other penalties, even transportation to the colonies. These methods were of no avail, for the French industry was started with English machines and English workmen smuggled across the Channel in spite of all edicts.

There is not much demand ordinarily for very wide machines. The regular widths are 172, 184, and 222 inches. In 1907 of 206 "go-through" machines sold by John Jardine of Nottingham (the largest lace-machine manufacturer in the world) 90 were 172 inches wide on the metal, 73 were 184 inches, and 43 were 222 inches wide. The fancy-lace machines employed run from 8 to 18 point, which means 16 to 36 bobbins to the inch of width. The cost of fancy-lace machines vary, according to the width and gage, from \$3,000 to \$5,000 each.

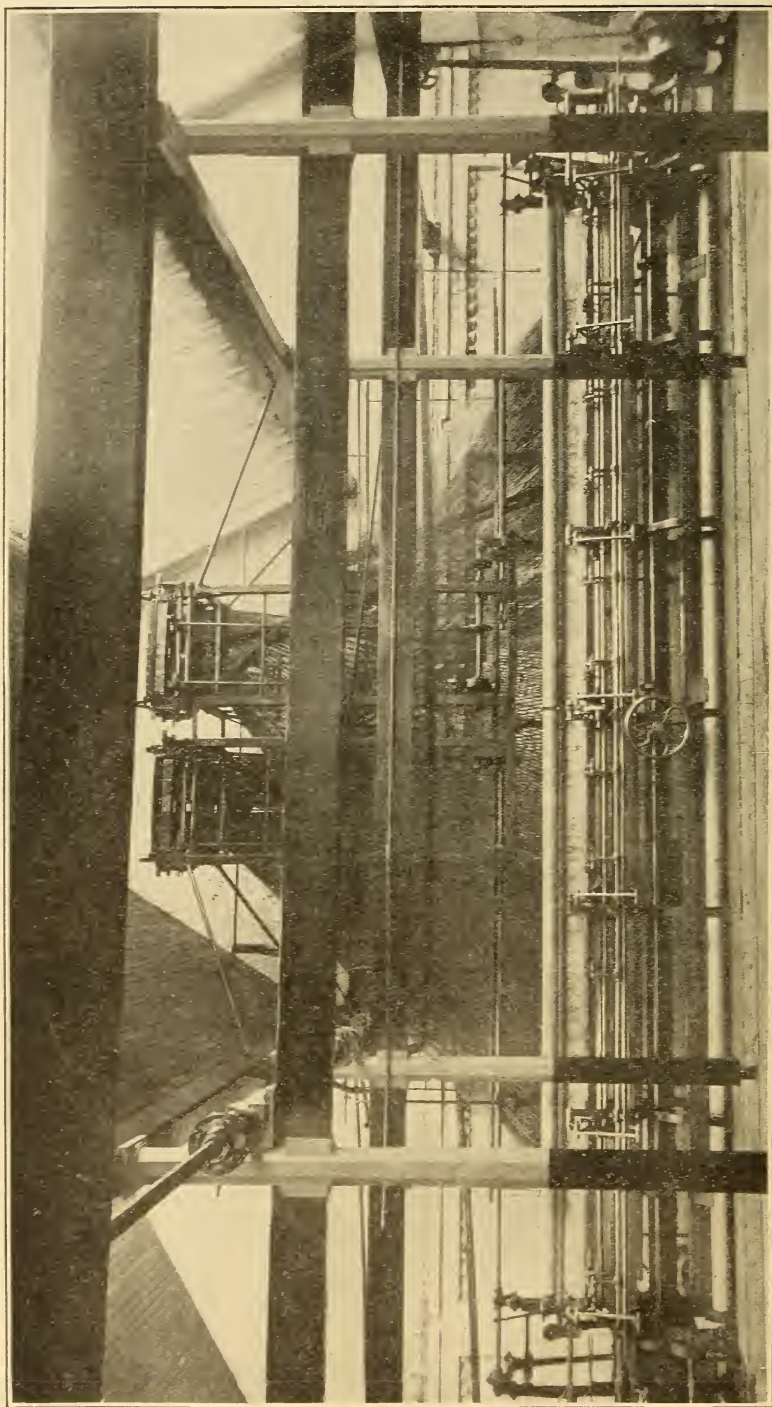


FIG. 1.—372-inch lace curtain machine as made by Swift & Wass for Swiss and combination curtains.

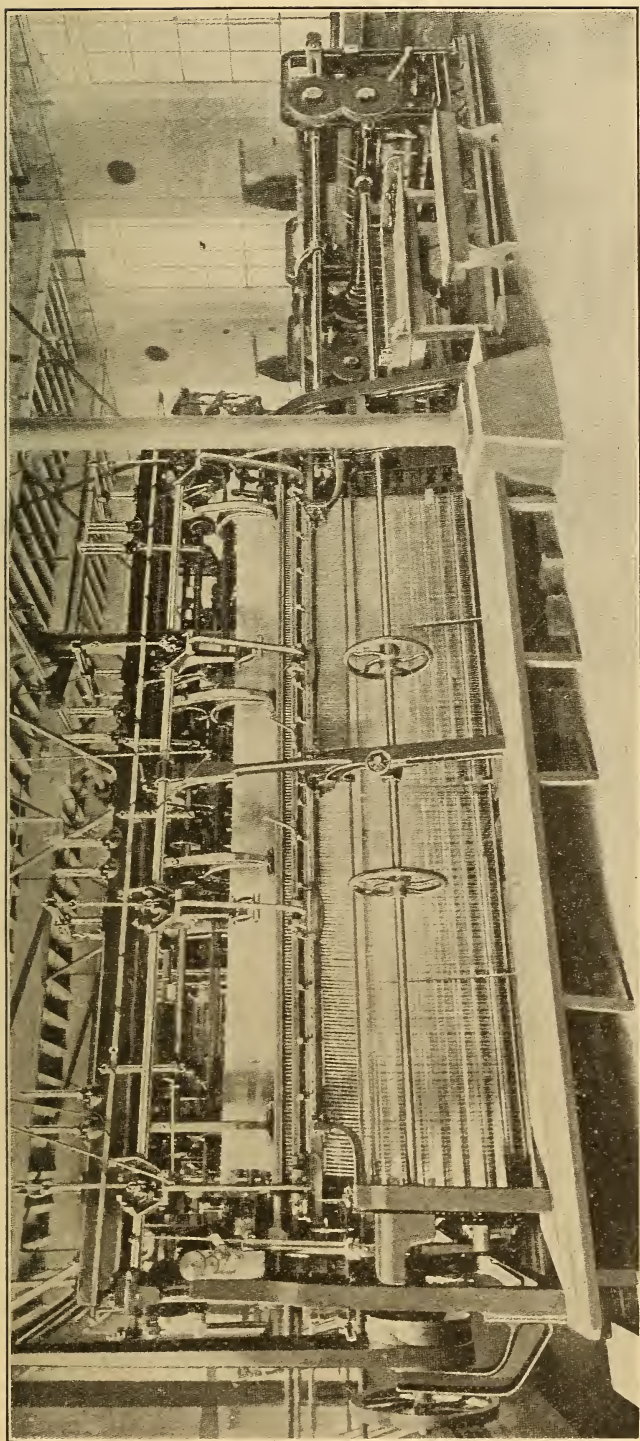


FIG. 2.—One of Jardine's patent "Go-through" machines, 184 inches wide on the metal, and for 160 top bars.

There are two general types of the fancy-lace machine, the "Levers with lean bars" and the "Levers go-through." In the first the thin steel chariots that carry the bobbin, in swinging back and forth across the "well" (the central space left for the vertical warp threads) from one set of combs to the other land on brass sliding bars, while in the "go-through" they slide into the combs without any brass bars. The trade defines a "go-through" lace machine as one which carries the bobbin threads twice through the warp at one revolution of the crank, and works without "landing bars." This permits of higher speed and as it gives more production it is the one now most largely employed.

SPEED OF MACHINE—PREPARING THE YARN.

Its method of operation, however, puts more strain on the yarn, due to the quicker motion, allowing less "dwell" of the chariots at the

end of their course, which makes more of a jerk at every reverse of the direction. The Levers with lean bars has therefore had to be employed for the finer work, but Jardine has recently modified the motion of the chariots by means of elliptical gearing so that the speed is much less at the ends than in the center of the swing. As this allows of any desired dwell, it tends to make this type of machine suitable for much work, for which heretofore the slower, old style machine only was adapted. Jardine's elliptical gearing arrangement for "Go-through" machines is shown in Fig. 3.

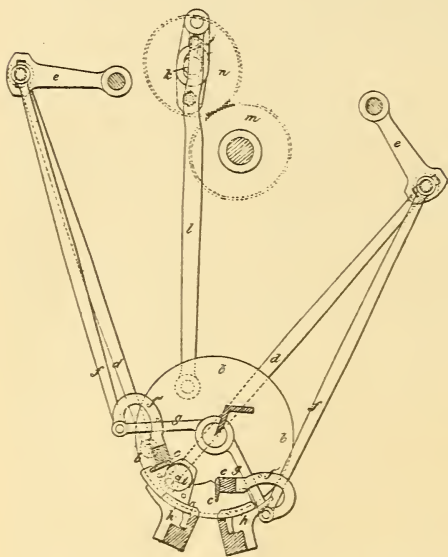


FIG. 3.—Jardine's elliptical gearing arrangement for "Go-through" machines.

the size of the rack, but will average something like a yard an hour. The number of inches produced per rack of 1,920 motions is called the "quality" at Nottingham, and is the same as the term "rendement" used by the French. The Levers lace machine is described in my Calais report, and as the same type of machine is used at Nottingham it is needless to reproduce it here.

The methods of preparing the yarn, which is bought on either the cop or the hank, is also the same. As in France the thin steel bobbins after being taken from the frame have the small portions of thread remaining wound off, and are then again filled with thread on a bobbin-winding machine, where 120 are filled at one time. Before replacing in the machine the bobbins are heated and dropped over a central bolt, and a top weight screwed down until they have been

Fancy-lace machines are run at a speed of 110 to 120 picks per minute. The production varies according to

pressed out perfectly flat. Bobbins are usually made of hard, rolled brass in two pieces. A recess in the metal on one side of each piece allows space enough to hold the thread after they have been riveted together. Usually about thirty minute rivets are used in each bobbin. A bobbin for 11-point lace is so thin when completed that it is only one forty-eighth of an inch in thickness, with the yarn inside.

The lace machines at Nottingham have their width stated in quarter-yards and this basis is used in the wage schedules. The average wages earned by lace makers on Levers fancy-lace machines at Nottingham are from 45 to 55 shillings (\$10.95 to \$13.38) and on plain net machines 32 to 44 shillings (\$7.78 to \$10.70) a week; specially skillful workers are paid more.

BAND CIRCULAR MACHINE.

While in the fancy lace line Calais makes more than Nottingham and has a greater reputation for artistic work, in making net the English are ahead, at least in quantity. Plain net is a very important branch of the lace industry at Nottingham, and there is a large export trade, especially to Switzerland, which uses tons of English-made net every year as a foundation material for its embroideries. The Jacquard is not usually employed on net machines. The "band circular machine" takes up less space and looks simpler than the Levers machine, but it is really more complicated, as far as the main machine goes, and costs more to build. The prices run from \$3,000 to \$7,000, according to width and gage. The usual gages are 5 to 14. These machines are known as "double locker" or "rolling locker" plain net machines, according to the method of driving the bobbins. The French call them "1 jeu" (one play) or "2 jeu" according to whether one or two rows of bobbins are employed. In the first case if the machine is 300 inches long and there are 16 bobbins side by side there will be 4,800 bobbins in all, and in the latter case 9,600 bobbins. Where two rows of bobbins are used each pair swings back and forth in the same line, and as this arrangement gets in more threads in the same width it permits of finer work and can also be used with special appliances for ornamentation.

In a fancy-lace machine the two rows of combs or grooved bars in which the chariots slide are stationary. In a band circular machine they are movable and placed back and front of the warp threads so as to be in the circumference of a circle, hence the name "band circular machine." When the bobbins have moved through the warp, the comb bar, which receives them on the other side, has a lateral motion given it equal to the space between two threads. If, then, the bobbins be brought back on the contrary side of each vertical warp thread, each bobbin thread will have made one twist with a warp thread. If now the front comb bar be moved laterally till each bobbin stands opposite the space from which it first started and the bobbins be again passed through and brought again to the front on the other side of each vertical warp thread, the threads will have been twice twisted. The machines are made so that each bobbin, as it gradually moves up from one end of the machine to the other and back, can be made to twist one, two, three, or more times

around each of the warp threads met within its course, but usually a particular machine will not have more than one variation; that is, it can be set to twist two or four times or another one can be set to

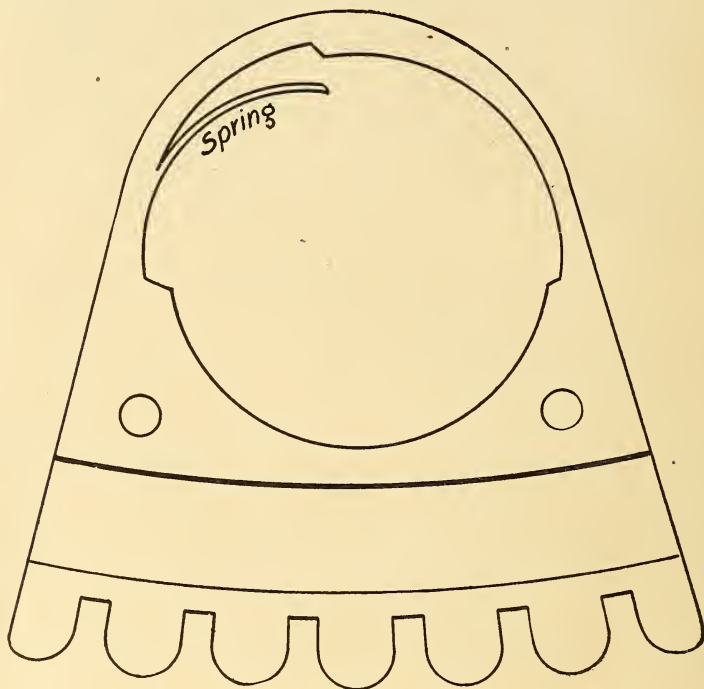


FIG. 4.—Bobbin chariot used on plain net machine; full size.

twist three or five times, etc. A good band circular machine will make more than 30,000 meshes a minute. In the case of the band

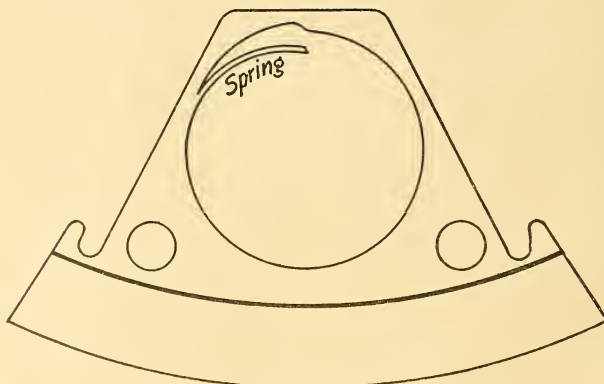


FIG. 5.—Bobbin chariot used on Levers fancy lace machines.

circular machine the push bars can not be used to move the chariots, as in the Levers machine. They are driven positively by means of long gears or pinions, which run from one end of the machine to the

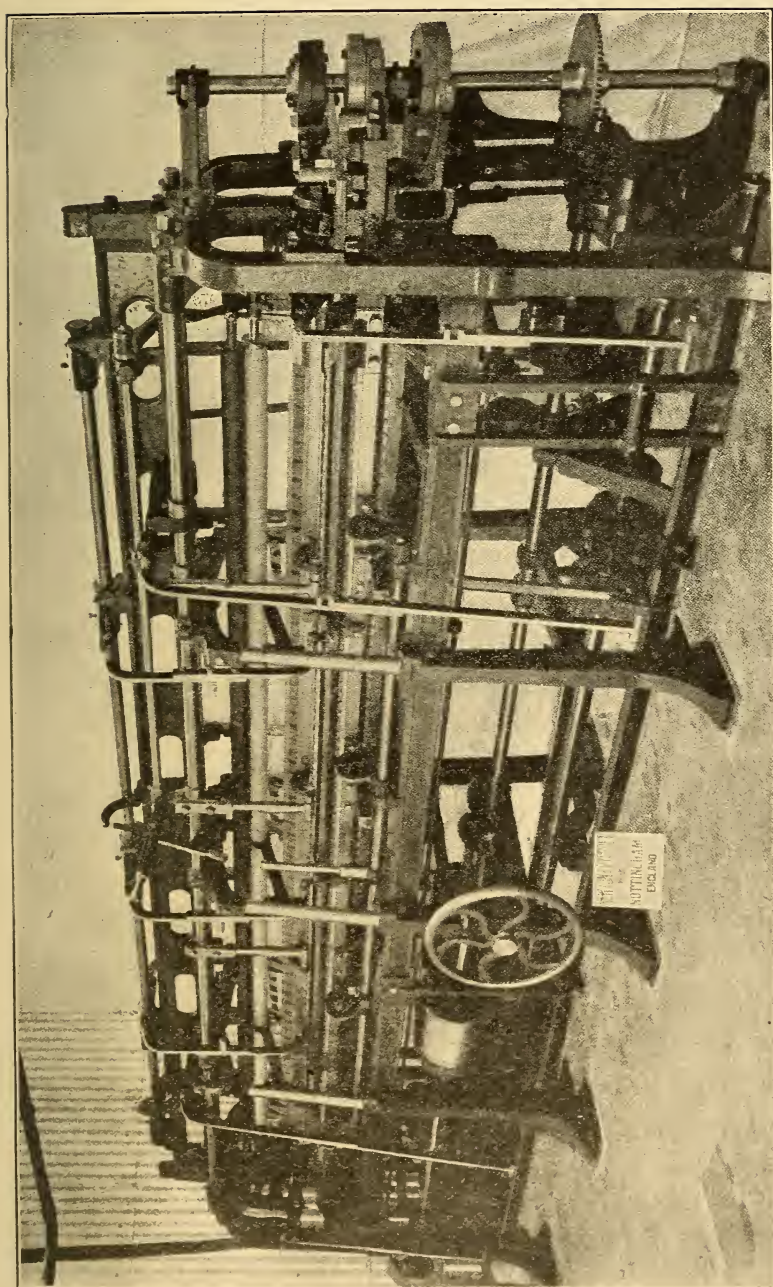


FIG. 6.—Double locker plain net machine.

other, and which gear with teeth cut in the bottom arc of each chariot. The quality of net depends on the smallness of the meshes, their equality in size, and the regularity of the hexagons.

In square tulle the machine is made usually with stationary combs and only one set of bobbins. There are two long beams under the machine, the one carrying the warp threads tightly stretched and the other the filling threads loosely wound. The thread from the bobbin follows the warp threads and wraps around it and the filling where they join together.

CURTAIN-MACHINE OPERATIONS.

The lace-curtain machine is the widest lace machine made, as the usual width is from 200 up to 440 inches. Ply yarns are nearly always employed and the gage is much coarser than ordinarily employed on other lace machines. In this, as in other cases, the finer the design and the higher the counts of yarn the narrower is the machine required. "Point" on a curtain machine means double the coarseness of the term as employed for Levers machines; that is, 10-point Levers lace is made with 20 bobbins to the inch, while 10-point curtain lace is made with only 10 bobbins to the inch of width. The curtain gages used run from as coarse as 5 up to about 18, and the fine gages used on Levers machines are not found on curtain work. The prices of curtain machines vary according to the width and gage from \$2,500 to \$3,500. The curtains at Nottingham are made in any width from 30 to 75 inches or wider. A usual width is 60 inches, and machines are ordinarily made a multiple of this in width, with an allowance for side space. On fancy lace machines the Jacquards are at the sides as the outline and guimp threads, as well as the regular warp threads, are on beams under the machine; curtain-lace machines draw the ornamenting threads from a horizontal creel of spools at the back of the machine, and so put the Jacquards overhead. Fancy-lace machines employ bobbin threads and three kinds of beam threads. The lace-curtain machine employs bobbin, warp, spool, and extra beam threads.

Fancy lace is usually made in a series of narrow strips, curtains are made in a series of wider breadths, and net is usually made in one piece the full width of the machine.

WORKING OUT DESIGNS.

It may be noted that the designs for the Jacquard cards are punched differently for fancy lace and for curtain lace work. In the first case the design is small and quickly read and the cards are punched direct on the piano punching machine. For curtains the designs are so much larger that the cards are punched by the tying-up and selector machine method. This system is as follows:

The design is drawn on white relief on a black background, then transferred and painted in colors on cross-section paper. This sheet is fixed on a vertical board to be "read." The reader's object is to make arrangements for punching a series of Jacquard cards in the order required. Hanging from the frame in front of the reader are a number of strings, of the nature of whipcord, and transversely to these, at one side of the frame, are other similar cords. The lines in the pattern represent lines in the curtain, and for every one there is a

cord. The reader so arranges the cords that when attached to the selector they will each exercise a controlling effect in producing one motion at the correct place in the pattern. The reader rapidly and deftly works with his fingers among the cords, separating some and taking up others, and getting them in groups, at the same time forming a kind of interlacement with the transverse cords, so as to show in a rough but correct way something of the pattern before him. As the reader is paid per 100,000 squares of the pattern read, he has to be a skillful worker. A good reader will earn £2 10s. (\$12.17) a week.

When the reading is finished, these carefully grouped cards are laid on a long horizontal frame called a "selector," to which, at one end, is attached a punching frame. According to the order in which the groups of cords fall, each cord acts upon punches to which they are connected and in such way as to perforate the required number of holes in one card. As each group is in its order taken up by a treadle movement they are made to act upon the punches, and simultaneously with each perforation movement a card drops into the receptacle placed beneath. These cards follow each other in sequence of design and are strung together to form the pattern, there frequently being 1,500 or more in a design. The cards are laced together either by hand or automatically, many of the Nottingham manufacturers preferring the slower and more primitive hand system as being better and more reliable.

Whether fancy lace, net, or curtains, the manufacturer's work ceases with "making," and he usually sells in the gray. They then go to the finishing factories. Even where manufacturers own finishing plants, which is not usual, the finishing plant is always entirely separate and in another part of the town, usually in the suburbs and under a different manager.

DRESSING AND FINISHING FACTORIES.

Nottingham is noted for its lace-dressing establishments, and much lace that is made elsewhere is brought here to be finished, making this town the great central point for the lace trade of the country.

The bleaching and finishing of lace, being a special branch of the trade, is nearly always carried out by a separate establishment and usually by firms who do nothing else. At Nottingham there are 27 of these lace and net dressing firms that employ altogether, according to 1907 figures, some 1,638 operatives, of which only 221 are men (foremen and laborers mainly), 1,002 adult females, 408 young persons (nearly all girls) and 7 children. The women are paid by the hour, 2½d. to 3d. an hour, which is about 12s. 10d. to 14s. (\$3.12 to \$3.30) for a fifty-six-hour week, and the forewomen in the drying rooms £1 10s. (\$7.29) a week, while the male laborers average about £1 (\$4.87) a week.

The great bulk of the operatives in these dressing factories are women, and some firms—at least three or four of the largest—have morning services in a chapel connected with the mill from 8 to 8.30, which is attended by all operatives and the time is counted in the pay roll.

Lace or net is a delicate fabric and has to be handled carefully in the finishing processes. After "making" on the machine it is carted

to the finishing plant. Nearly all of this is in the gray state, as very little is made of bleached yarn. Here it is first carried to the "dipping room" and washed, then bleached with alkaline dyes, again washed, and the superfluous water removed in a hydro-extractor. Some of the coarser grades are put through the stocks, usually curtain work. These, while similar to the familiar stocks employed in woolen cloth felting, are of gentler action, the lace being put in masses in a big tub, and vertical wooden blocks fastened to horizontal cranks are used to stamp on it until beaten clean. After bleaching and washing, and in some cases dyeing, the material is starched, gelatin being used for silk and rice starch ordinarily for cotton materials, the superfluous material squeezed out by running between wooden rollers and the material then carried in a wet condition to the dressing room to be dried.

DRYING MACHINE—NET-LACE DRESSING.

In the case of curtains and similar coarse materials the drying is done by means of the ordinary tentering machine. This machine consists of two rows of chain tenterhooks, to which the material is attached, and these pass as an endless chain through an inclosed drying box heated by multitubular boilers, the air being driven through the steam-heated boiler tubes and the lace coming out and winding up on a roller at the other end.

The dressing frames as used for net, etc., consist of a pair of movable rails placed about 3 feet above the floor and arranged so that they can be separated from each other to any required distance. Each rail carries a row of pins on which the material is fastened and then a winch is used to draw them apart to the original width of the lace as it was made in the machine. Some rails are arranged so that they can be swung back and forth in opposite directions so as to open out the meshes to their correct shape before leaving to dry. This same method is used at Tarare, in France, and other similar places for squaring the threads in fine muslins before drying.

The roll of lace as dried on these Nottingham frames is frequently 300 inches or more in width and is brought to the machine by a gang of girls who hold it up and unroll it as the girls at the end deftly and quickly fasten the selvages onto the pins, and when the entire web has been laid on the winch draws it out to the correct width. Each room has two or three sets of frames, so that while one web is drying the girls can be putting on or taking off another web. Owing to the glutinous nature of the dressing it has a tendency to form a film over small mesh goods, so that sometimes the stretched web is beaten lightly with small switches or rubbed gently with fine flannel cloths. In the case of some fine silk nets the unstarched fabric is placed upon the drying and stretching frames and the dressing material applied to the stretched material on the frames.

The drying rooms are usually long, about 100 yards by 15 to 20 yards wide and 9 to 10 feet high, with numerous wide windows and with revolving fans over the frames to assist quick drying. To make good work that will give a clear, crisp, elastic finish with correct weight and "dress" it is necessary to use the correct size required for the particular material, and the temperature and humidity of the drying room is also very important. Although ordinarily fine lace and net

is not heavily starched, in some cases, such as nets to be used for the foundation of bonnets, etc., the material is starched up to four times its original weight.

HIGH TEMPERATURE NOT CONSIDERED UNHEALTHFUL.

The temperature of the lace-dressing rooms is necessarily kept high. This does not exercise any adverse influence on the health of the operatives, as was proved by an investigation made by the British Government in 1906. In fact, it was shown that they are an unusually healthy and long-lived lot. Among those interrogated were found 11 lace dressers who had worked in lace-dressing rooms for over fifty years each, 21 for over forty years, 33 for over thirty years, and 66 for over twenty years. This is probably due to the fact that while the air is relatively dry and high it is pure and plentiful in the working rooms, for the cubic space per operative in such rooms was found to vary from 2,000 to 6,000 cubic feet. The ventilation is always good, as it is necessary to carry off the moist air arising from the drying webs. Though subject to colds at first, the worker's constitution soon gets hardened to it and the conditions seem to make them less subject to lung troubles than workers in ordinary factories.

The windows in these rooms frequently extend to the ceiling and are furnished with pivot sashes horizontally swung, a form of sash which gives a maximum of opening when the casement lies in a horizontal plane. In rooms using the inclosed continuous centering machine alone the temperature is not more than 80° F., except in the immediate neighborhood of the openings and the feeding end of the machine. In the regular lace-dressing rooms the 1906 inquiry showed the highest temperature found to be 106° and the lowest 67° F., and the driest air discovered contained 27 per cent of saturation and the moistest 53 per cent of saturation.

After bleaching and dressing, the lace is inspected and mended. This is carried on in clean, well-lighted rooms and the girls are very skillful in remedying defects with their needles. For working on white lace the girls often wear blue or black aprons. For scalloped or vandyked edges "clippers" cut around the shaped edges and remove the superfluous material. For clipping off floats as made on fancy lace, etc., the piece is wound between two beams on a small trestle; a yard is unwound at a time and two girls carefully clip off all floating threads and then unwind another yard. Where such floats are in a straight line, as occurs on some types of lace, this can be done by machine. There is less outside clipping work in the Nottingham than in the Calais district, one reason being that net and curtains, that form a good proportion of the Nottingham trade, do not usually have such floats.

The lace is edged by girls called "purlers." Formerly the usual custom was to cut off the projecting threads and then turn down the edges and sew on a tape, but a Singer machine is now largely employed that has been designed to trim, scallop, and overedge the curtains at one operation. Either the tape or an overlock seam can be made as desired.

UNIFORM SALES LISTS.

At St. Gall the United States Treasury agent, after consultation with the manufacturers, etc., makes up a standard list of prices to which all have to conform in shipping embroideries to the United

States. Such a system was partially tried at Nottingham for nets, and for a while a committee of two of the leading manufacturers and five of the larger finishers met regularly with the American consul and fixed values for the different grades, and these were adopted as the uniform prices for invoicing goods during the ensuing three months. Quite recently the Nottingham trade has raised objection on the ground that there was no similar system used with their competitors at Calais, so that this system has been temporarily dropped until some uniform method could be invented for all. The last list of uniform prices made up, which, owing to the state of the trade, was much lower than those preceding, is still about the basis on which such goods are now being invoiced and is given below as showing the standard sizes and something of the range of prices:

Schedule for cotton mosquito netting.

Prices are net, with no allowance whatever. Prices are in pence per yard of length and based on a standard width of 240 inches; other widths in proportion. Prices are for white goods, scoured ecru being considered the same as white. The nets are listed according to the number of holes or meshes per square inch.

	Holes.	Price in pence.
Light grade, Nos. 40/60 or 50/60 cotton.....	16	12½
	17	13½
	18	14
	19	15
	20	16
	21	17
	22	18½
	23	19½
	24	21
	25	22½
	26	24
	27	25
	28	26
	29	28
	30	30

(Arab, 16 to 22 holes, 1½d. extra; Arab, 22 to 26 holes, 1½d. extra; Arab, above 26 holes, 2d. extra.)

	Holes.	Price in pence.
Double grade, Nos. 30/30 or 28/30 cotton.....	16	18½
	17	19½
	18	20½
	19	21½
	20	22½
	21	24½
	22	26½
	23	28½
	24	29½
	25	30

(Arab, 3d. extra for fine qualities or 2½d. for slacker.)

	Holes.	Price in pence.
Treble grade, No. 20/20 cotton.....	16	24
	17	25½
	18	27½
	19	28½
	20	30

(Arab, 4½d. extra.)

Schedule for cotton Mechlin nets.

Prices are net with no discount whatever. Prices are based on standard width of 36 inches and other widths are listed in proportion. Prices are for white goods; black or colors are one-quarter penny extra.

	Holes.	Price in pence.
Coarse cotton Mechlin nets.....	20	1 $\frac{1}{6}$
	21	1 $\frac{1}{8}$
	22	1 $\frac{1}{4}$
	23	1 $\frac{1}{8}$
	24	2
	25	2 $\frac{1}{2}$
	26	2 $\frac{1}{2}$
	27	2 $\frac{1}{2}$
These nets are liable to vary two holes, this being unavoidable, bobbin and mosquito.	28	2 $\frac{3}{4}$
	29	3
	30	3 $\frac{3}{8}$
	31	3 $\frac{3}{8}$
	32	3 $\frac{3}{8}$
	30	3 $\frac{3}{8}$
	31	3 $\frac{3}{8}$
	32	3 $\frac{3}{8}$
Fine cotton Mechlin nets.....	33	3 $\frac{3}{8}$
	34	4
	35	4 $\frac{1}{8}$
	36	4 $\frac{1}{8}$
These nets usually vary only one hole.....	37	4 $\frac{1}{8}$
	38	4 $\frac{1}{8}$
	39	5
	40	5 $\frac{1}{4}$

Bobbin bretonne or wash blonde.

Prices are net with no discount whatever. Prices are based on standard width of 36 inches, other widths in proportion. Prices are for white goods; ecru, black, and other colors about one-quarter more. Prices are for goods in boxes; if unboxed about one-eighth less.

Holes.	Price in pence.	Holes.	Price in pence.
18	2	37	5 $\frac{1}{4}$
19	2 $\frac{1}{4}$	38	6
20	2 $\frac{3}{8}$	39	6 $\frac{1}{4}$
21	2 $\frac{1}{2}$	40	6 $\frac{1}{2}$
22	2 $\frac{3}{4}$	41	7
23	2 $\frac{3}{4}$	42	7 $\frac{1}{4}$
24	2 $\frac{3}{4}$	43	7 $\frac{1}{4}$
25	3	44	8 $\frac{1}{4}$
26	3 $\frac{1}{4}$	45	8 $\frac{1}{2}$
27	3 $\frac{1}{2}$	46	8 $\frac{3}{4}$
28	3 $\frac{3}{4}$	47	9
29	4	48	9 $\frac{1}{2}$
30	4 $\frac{1}{4}$	49	10
31	4 $\frac{1}{2}$	50	10 $\frac{1}{2}$
32	4 $\frac{3}{4}$	51	11
33	4 $\frac{3}{4}$	52	12 $\frac{1}{2}$
34	5	53	13 $\frac{1}{2}$
35	5 $\frac{1}{4}$	54	14 $\frac{1}{4}$
36	5 $\frac{1}{2}$	55	15

WAGE SCHEDULES.

RATES ARE FIXED BY ARBITRATION—COMPREHENSIVE PRICE LISTS
FOR EVERY LINE.

In August, 1905, the Board of Trade appointed an arbitrator to settle disputes between the Nottingham Lace Manufacturers' Association and the Amalgamated Society of Operative Lace Makers. After conference with both sides the arbitrator drew up a separate piecework schedule for each of the three branches of the trade, the Levers branch, the plain net branch, and the lace curtain branch. This schedule is now in force and will continue to be in force in the city of Nottingham until October 23, 1910, when it will be open to revision by either party on two months' notice being given.

LEVERS BRANCH OF THE NOTTINGHAM LACE TRADE.

For the Levers branch the arbitrator divided the laces made into the following 15 classes, with special remunerations for each:

1. Plain bobbin fining goods and banded Valenciennes.
2. Thick threaded bobbin fining goods.
3. Cotton loop lace.
4. Valenciennes made with all independent beams.
5. Gimped Valenciennes.
6. Torchons, guipures, maltese, and Cluny.
7. Silk, Spanish.
8. Blonde laces and streamers, and masque falls.
9. Large silk sprig or striped nets.
10. Spot or sprig nets.
11. Silk veiling and fancy nets.
12. Hamburgs and Russian points.
13. Trimmings.
14. Bagley's.
15. Wool yak laces.

The following general instructions apply to all of the foregoing price lists for Levers lace:

1. All bars at work to be counted, except selvedge bars and bars threaded at brackets only. No bars to be counted twice.
2. When the front bars in Vandyke or Eiffel laces are guimping every motion so as to cover the whole of the pattern with raised floss work, and additional $\frac{1}{4}$ d. per rack for every 10 or portion of 10 bars shall be added to the price.
3. When the bottom jacquard is out of gear, $\frac{1}{4}$ d. per rack shall only be paid for every 100 or portion of 100 threaded bottom bars.
4. When bars threaded are not required in a pattern, and are marked on the dead-stop paper as "in or out," the threads may be left up or pulled down at the discretion of the lace maker to save alteration, but such bars shall not be paid for. The bars marked "in or out" shall only apply to back or center gimps and warp threads.
5. Changing or racking cards, 1d. per rack up to two packs, beyond two packs $1\frac{1}{2}$ d. per rack.
6. When making cross bands, $\frac{1}{4}$ d. per rack per line up to four lines. No advance beyond four lines.
7. In calculating the length of rack the quality to be measured on the machine, according to the order given.
8. The lace maker may stay one hour after the ordinary time for changing shifts.

9. In case of necessity, as getting a piece off which is urgently needed or to make samples, men working single-handed may stay one hour later than the usual time, such time to be taken off the following day.

10. All materials which have been dyed to represent the natural colors of silk, cotton, wool, or linen shall be paid for as colors.

11. When two colors or shaded threads are worked in the bobbins $\frac{1}{4}$ d. per rack to be paid. When more than two colors or shaded threads are worked in the bobbins $\frac{1}{4}$ d. per rack to be paid. When working brown or white with any color or shaded thread in the bobbins these clauses to apply.

Lace makers' working shifts to stop not less than twenty minutes for breakfast, tea, and supper. Single-handed men and lace makers on day work to stop thirty minutes for breakfast and tea, one hour for dinner. The exact hour of stoppage to be arranged by the employer and the shop committee.

No stoppages shall be made for places caused by the fault of the machine, whether it be the jacquards, cards, or other portions of the machinery. Where neglect of the workman cause extra mending, places across or spoiled work, and where a workman fails to carry out written instructions in a workmanlike manner, a claim for stoppage may be made by the employer, but all claims must be supplied in writing with particulars to the shop committee. Unless the shop committee receive such particulars and consent to the stoppage, no stoppage shall be made, and the employer shall be left to such other remedy as may be open to him.

There shall be one learner to every seven or portion of seven men, such learner to serve for four years, and to be paid as follows: For the first two years the learner shall receive one-half the rack price; the third year five-eighths, and for the fourth and last year, three-fourths on one-half the racks made upon the machine in which the learner is placed. The difference to be equally divided between the employer and teacher. The above rule applies to alterations also. In all cases the teacher must be an operative lace maker.

All work when lace makers are not making racks shall be called "day work" (except tying in warps or reentering instead of tying in), and shall be paid for at the rate of 5s. per day of ten hours.

When five consecutive hours are made in any alteration the time to be paid for as half a day. Saturday shall be paid for as a full day when two other full days have been worked in the same week. When less than two full days have been worked, Saturday shall be paid for as half a day.

The foregoing are the shop rules for Levers machine work. The system of payment according to the decision of the arbitrator is shown by the complete list for the first article, which is as follows:

I. Plain bobbin fining goods and banded Valenciennes.

(Without thick threads, lining threads or gimps; made with top or top and bottom bars.)

Standards: Rack 1,920 motions; gage, 10 points; width of machine above 18 and below 20 quarters of a yard; quality from 9 to 15 inches, inclusive; bars up to and including 80—all top net bars (not inclusive of net bars traversing more than 5 gates), backs, fronts, and band threads to be counted as bars, price fivepence halfpenny per rack; minimum price for any width or gage, fourpence halfpenny per rack.

Bars: For every 20 or portion of 20 bars over 80, one farthing per rack; for every 50 or portion of 50 bottom bars up to 600, one farthing per rack, no advance beyond 600; for every 10 or portion of 10 net bars traversing more than 5 gates, one farthing per rack; for every 10 or portion of 10 straight threads in a breadth not thicker than 60/3 or its equivalent, one-eighth per rack; coarser than 60/3 or its equivalent, for every 10 or portion of 10, one farthing per rack.

Fluctuations: (1) Gages above 10 points up to and including 12 points 1 farthing per gage to be added; beyond 12 points 1 farthing per half gage to be added; and gages below 10 points 1 farthing to be deducted—no deduction below 8 points; (2) quality below 9 inches to 8 inches, inclusive, 1 farthing per rack to be deducted; below 8 inches a further farthing to be deducted; quality above 15 inches to 20 inches, inclusive, 1 farthing per rack to be added; above 20 inches a further farthing to be added; (3) for 16 quarters and above 16 quarters up to 18 quarters, inclusive, 1 farthing per rack to be deducted; below 16 quarters a further farthing to be deducted; for 20 quarters and below 22 quarters 1 farthing per rack to be added; for 22 quarters and above a further farthing to be added. Extras: (1) Black, pearl white, or all silk, 1 penny per rack; (2) silk, tussah, wool, or China grass worked from inde-

pendent beams, one-eighth of a penny per rack per thread up to 4 threads in a breadth, no advance beyond 4 threads; when black, pearl white, silk, tussah, wool, or China grass are confined to the bobbins, 1 halfpenny per rack only to be added; (3) when in making cotton goods silk is used in lacers and draw threads only, 1 farthing per rack to be added; (4) lacing threads on the net, 1 farthing per rack; (5) when using whipper bobbins, 1 farthing per rack to be added.

In the above, "quarters" refer to the width of the machine in quarters of a yard. "Quality" refers to the number of inches of lace produced per rack of 1,920 motions.

PLAIN-NET BRANCH OF THE NOTTINGHAM LACE TRADE.

By agreement between the Nottingham Lace Manufacturers' Association and the Amalgamated Society of Operative Lace Makers an arbitrator was called in to settle wage disputes and he made up price lists for the following classes of nets:

Circular lace machine making plain nets.

Stiff quality plain nets: (a) with double cotton in bobbins, (b) with single cotton in bobbins.

Coarse gages.

Making quilling: (a) cotton quillings, (b) silk quillings.

Brussels or five twist.

Mechlin nets: (a) 12-motion cotton mechlin, (b) 20-motion cotton mechlin, (c) 12-motion silk mechlin, single tier, (d) 12-motion silk mechlin, double tier, (e) 20-motion silk mechlin.

Circular machines making diamonds.

Sprig net, with traverse ground.

Traverse net, with spotting: (a) silk goods, (b) cotton goods.

The following general instructions apply to all of above:

When a lace maker in the plain net section is employed otherwise than in making lace in a machine, such employment shall be termed day work: the term day work shall include springing carriages when altering from one class of goods to another, reentering parts of beams or warps knocked down through no fault of the employee, or reentering warps cut out before being emptied: day work shall be paid for at the rate of 5s. per day of ten hours when all the machines are standing, and a proportion of this when one or more machines are going.

Short alterations: (1) When five consecutive hours are made in any alteration the time shall be paid for as half a day; (2) Saturday shall be paid for as a full day when two other full days have been worked in the same week: when less than two full days have been worked, Saturday shall be paid for as half a day; (3) the lace maker may stay one hour after the ordinary time for changing shifts; (4) in case of necessity, as getting off a piece urgently needed or to make samples, men working single-handed may stay one hour later than the usual time, such time to be taken off the following day; (5) the foregoing rules are to be generally recognized as shop rules for the whole trade; any other shop rules in any particular shop must be such as are agreed to by the employer and employees.

Minors, working in plain net branch: The full rack price to be paid to the machine; there shall be one learner to every seven or portion of seven men, such learner to serve for four years, and to be paid as follows: For the first three months, 3d. in the shilling, and for the last nine months of the first year, 4d. in the shilling; 4½d. the second year; 5d. the third year, and 5½d. the last year; providing a minor when put in the machines be under 18 years of age, he must attain the age of 19 before he receives 4½d. in the shilling; any person introduced into the trade shall, after having served four years in a machine, in any branch or branches of the trade, be considered a competent lace maker: the teacher shall undertake the general management of the machine, shall be responsible for the quality of lace made, and also for the orders being executed correctly and in a workmanlike manner.

CIRCULAR LACE MACHINES MAKING PLAIN NETS.

The system of payment in the plain net branch is shown by the following price list, standard rack, 240 holes:

(1) Twelve quarters, 10 points, brown cotton plain net, eleven-sixteenths of a penny perrack, and one-sixteenth of a penny in addition for every $13\frac{1}{2}$ inches in width above a 12 quarter. The following clause applies only to plain nets, quillings, tapes, and mechlins: No extras to be paid when working 40s or 50s, single cotton in the bobbins; when working over 50s up to 80s, inclusive, one-sixteenth extra, and when beyond 80s, one-eighth extra. All machines working with single cotton on the warp, one-eighth extra. (2) Twelve quarters, 10 points, making plain silk goods in natural colors (white or yellow), seven-eighths of a penny per rack; 12 quarters, 10 points, making queen's or other breadths, 1d. per rack; and to be raised one-sixteenth of a penny per quarter of 9 inches on all machines above 12 quarters making silk. (3) For taping up to three-quarters of a bar, 1 farthing per rack extra; from three-quarters of a bar up to craping, three-eighths of a penny per rack extra; for craping, seven-sixteenths of a penny per rack extra. (4) When working jacked-off silk, one-eighth of a penny per rack extra. (5) All odd inches in the machines to be added together and if they amount to 6 inches, to be paid for as $13\frac{1}{2}$ inches. (6) All machines working half gage to be paid for at the same rate as if working full gage.

LACE-CURTAIN BRANCH OF THE NOTTINGHAM LACE TRADE.

By agreement between the Nottingham Lace Manufacturers' Association and the Amalgamated Society of Operative Lace Makers an arbitrator was called in to settle wage disputes, and he made up price lists for the following classes of curtains:

Three-gate curtains; four-gate curtains; three-gate curtains, muslin goods made with one bar only not full threaded; three-gate curtains, muslin goods made with one full threaded bar; three-gate curtains, muslin goods made with two bars, not full threaded; swiss curtains; combination and madras curtains; three-gate purls and scollops, laces, and hamburg nets; three-gate silk nets.

The following general instructions apply to all of above:

Alterations: All work when lace makers are not making racks shall be called "day work" (except when tying in main warps or reentering instead of tying in) and shall be paid for at the rate of 5s. per day; when a warp is cut out before being entered, the fresh warp shall be paid under short alterations, but the warp cut out shall not be paid for when reentered if the warp in the machine is emptied.

Short alterations: When five consecutive hours are made in any alteration the time to be paid for as half a day; when more than two lace makers are employed on short alterations in one machine each man shall be paid 6d. an hour; Saturday shall be paid for as a full day when two other full days have been worked in the same week, but when less than two full days have been worked the Saturday must be paid for as half a day; when short alterations have to be made it shall be permissible for the lace maker to come one hour before the ordinary time or stay one hour after the ordinary time for changing shifts; it is also permissible for single-handed men to come half an hour earlier or stay half an hour later in order to get a piece off which is wanted or to get out a sample, the time so made to be lost within seven days; no shop rules, except those as now made, will be recognized unless agreed to by the employers and employees.

Learners: That there shall be one learner to every seven men or portion of seven men, such learner to serve for four years and to be paid as follows: For the first two years the learner shall receive five-eighths of the rack price, the third year six-eighths, and for the fourth and last year seven-eighths on one-half the racks made upon the machine in which the learner is placed, the difference to be equally divided between employer and teacher; in all cases the teacher must be an operative lace maker.

The system of payment in the lace curtain branch is shown by the following example. (In this list the prices are given in pennies and thirty-seconds of a penny per rack. Thus on a machine 15 quarters

(of a yard) wide, 5-point gage, the price per rack paid the lace maker is seen to be 1¹⁸d. per rack, that is, 1¹/₃ s.d., etc.):

STANDARD I.—Prices for three-gate curtains.

Quar- ters.	Gage.											
	5	6	7	8	9	10	11	12	13	14	15	16
15...	1 ¹⁸	1 ¹⁸	1 ¹⁹	1 ²⁰	1 ²¹	1 ²²	1 ²⁷	1 ²⁷	1 ²⁹	1 ³¹	2 ²	2 ⁴
16...	1 ¹⁹	1 ²⁰	1 ²¹	1 ²²	1 ²³	1 ²⁷	1 ²⁸	1 ²⁹	1 ³¹	2	2 ⁴	2 ⁶
17...	1 ²¹	1 ²²	1 ²³	1 ²³	1 ²⁴	1 ²⁸	1 ³⁰	1 ³¹	2	2 ²	2 ⁶	2 ⁸
18...	1 ²³	1 ²³	1 ²⁴	1 ²⁵	1 ²⁶	1 ³⁰	1 ³¹	2	2 ²	2 ⁴	2 ⁸	2 ¹⁰
19...	1 ²⁵	1 ²⁵	1 ²⁶	1 ²⁷	1 ²⁷	1 ³¹	2 ¹	2 ²	2 ⁴	2 ⁶	2 ¹⁰	2 ¹¹
20...	1 ²⁶	1 ²⁷	1 ²⁷	1 ²⁸	1 ²⁸	2	2 ³	2 ⁴	2 ⁶	2 ⁸	2 ¹²	2 ¹³
21...	1 ²⁷	1 ²⁸	1 ²⁸	1 ²⁹	1 ³⁰	2 ²	2 ⁵	2 ⁶	2 ⁸	2 ⁹	2 ¹³	2 ¹⁵
22...	1 ²⁸	1 ²⁹	1 ³⁰	1 ³¹	2	2 ⁴	2 ⁷	2 ⁸	2 ⁹	2 ¹¹	2 ¹⁵	2 ¹⁷
23...	1 ³⁰	1 ³¹	2	2	2 ¹	2 ⁶	2 ⁸	2 ⁹	2 ¹¹	2 ¹³	2 ¹⁷	2 ¹⁹
24...	2	2	2 ¹	2 ¹	2 ²	2 ⁷	2 ¹⁰	2 ¹¹	2 ¹³	2 ¹⁵	2 ¹⁹	2 ²⁰
25...	2 ¹	2 ¹	2 ²	2 ³	2 ⁴	2 ⁹	2 ¹²	2 ¹³	2 ¹⁵	2 ¹⁷	2 ²⁰	2 ²²
26...	2 ²	2 ³	2 ⁴	2 ⁵	2 ⁶	2 ¹¹	2 ¹⁴	2 ¹⁵	2 ¹⁷	2 ¹⁸	2 ²²	2 ²⁴
27...	2 ⁴	2 ⁵	2 ⁶	2 ⁶	2 ⁷	2 ¹³	2 ¹⁶	2 ¹⁷	2 ¹⁸	2 ²⁰	2 ²⁴	2 ²⁶
28...	2 ⁶	2 ⁶	2 ⁷	2 ⁸	2 ⁹	2 ¹⁴	2 ¹⁷	2 ¹⁸	2 ²⁰	2 ²²	2 ²⁶	2 ²⁷
29...	2 ⁶	2 ⁶	2 ⁷	2 ⁸	2 ⁹	2 ¹⁴	2 ¹⁷	2 ¹⁸	2 ²⁰	2 ²²	2 ²⁶	2 ²⁷
30...	2 ⁷	2 ⁸	2 ⁸	2 ¹⁰	2 ¹⁰	2 ¹⁶	2 ¹⁹	2 ²⁰	2 ²²	2 ²³	2 ²⁶	2 ²⁸
31...	2 ⁹	2 ¹⁰	2 ¹⁰	2 ¹¹	2 ¹²	2 ¹⁸	2 ²¹	2 ²²	2 ²³	2 ²⁴	2 ²⁸	2 ³⁰
32...	2 ¹⁰	2 ¹¹	2 ¹²	2 ¹³	2 ¹⁴	2 ¹⁹	2 ²²	2 ²³	2 ²⁴	2 ²⁶	2 ³⁰	3
33...	2 ¹²	2 ¹³	2 ¹⁴	2 ¹⁵	2 ¹⁶	2 ²¹	2 ²³	2 ²⁴	2 ²⁶	2 ²⁸	3	3 ²
34...	2 ¹⁴	2 ¹⁵	2 ¹⁶	2 ¹⁶	2 ¹⁷	2 ²²	2 ²⁵	2 ²⁶	2 ²⁸	2 ²⁹	3 ²	3 ³
35...	2 ¹⁶	2 ¹⁶	2 ¹⁷	2 ¹⁸	2 ¹⁸	2 ²³	2 ²⁷	2 ²⁸	2 ²⁹	2 ³¹	3 ³	3 ⁵
36...	2 ¹⁷	2 ¹⁸	2 ¹⁸	2 ¹⁹	2 ²⁰	2 ²⁵	2 ²⁸	2 ²⁹	2 ³¹	3	3 ⁵	3 ⁷
37...	2 ¹⁸	2 ¹⁹	2 ²⁰	2 ²⁰	2 ²¹	2 ²⁷	2 ³⁰	2 ³¹	3	3 ²	3 ⁷	3 ⁹
38...	2 ²⁰	2 ²⁰	2 ²¹	2 ²²	2 ²²	2 ²⁹	2 ³¹	3	3 ²	3 ⁴	3 ⁹	3 ¹⁰
39...	2 ²¹	2 ²²	2 ²²	2 ²³	2 ²⁴	2 ³⁰	3 ¹	3 ²	3 ⁴	3 ⁶	3 ¹⁰	3 ¹¹
40...	2 ²²	2 ²³	2 ²⁴	2 ²⁵	2 ²⁵	3	3 ³	3 ⁴	3 ⁶	3 ⁸	3 ¹¹	3 ¹³

All widths above 40 quarters up to and including 12 points to advance $\frac{3}{32}$ d. per quarter and $\frac{1}{32}$ per gage; above 12 points and up to 16 to advance $\frac{2}{32}$ per quarter and $\frac{2}{32}$ per gage.

All curtains up to and including 8 points, when punched straight through, to be paid as curtain net, and above 8 points to be paid $\frac{3}{32}$ of a penny more than curtain net.

Additions to the three-gate curtain card: (1) Two-gate to be paid $\frac{7}{32}$ of a penny less, and four-gate $\frac{7}{32}$ of a penny extra; (2) all unfinished goods where change of cards is not required be paid $\frac{7}{32}$ of a penny less; (3) toilets, bed covers, eider downs, etc., either made with or without turn-again tackle, $\frac{3}{32}$ of a penny less than curtains; (4) all goods made with one lacing thread of 18 inches or under $\frac{6}{32}$ of a penny extra; above 18 inches nothing extra. Lacing threads in dressing selvages not to be paid for.

Extras for making colors in cotton only: (1) Where one color and up to three colors $\frac{23}{32}$ of a penny per rack extra to be paid; where more than three colors $1\frac{3}{32}$ extra to be paid; (2) if colors are worked on warp or in bobbins, or both, $\frac{7}{32}$ of a penny extra to be paid; (3) when working colors on less than full width to be paid in proportion to the number of breadths in which colors are introduced.

OPERATIVES AND LIVING CONDITIONS.

BETTER PAID THAN CALAIS WORKERS—INCOME AND EXPENSES— LABOR ORGANIZATION.

The population of Nottingham in 1908 is estimated to be in the neighborhood of 255,000. The town is dependent on the lace and hosiery trades, and to a large extent the fluctuations of population are a measure of the prosperity of these trades. In 1831, on the expiration of the patent rights on Heathcote's lace machine, there was a sudden increase in lace manufacturing and a great influx of workers to take part in the rapidly expanding business. This growth and attendant prosperity lasted until the American civil war, when there was a depression that extended over some dozen years. There was then renewed prosperity to 1883, when another depression set in. From this the industry gradually recovered and was put on a larger and more stable basis, but it is now hardly holding its own, for the tariff barriers in foreign countries and the steadily increasing French industry tend to prevent any great expansion.

The French, with their more artistic, cheaper, and almost as efficient workers, have taken the lead in the production of fancy laces and will possibly, in time, also in that of net, though in both net and curtains the English industry is still the largest. On account of lower taxes and less union restrictions in the country and suburbs, the lace factories now show a strong tendency to move outside of Nottingham. Thus the union, for instance, attempts to limit the length of the machines to be worked and these are so strong in Nottingham that they can control, while outside their power is weaker, so that most of the newer long machines are now installed at Long Eaton and other places farther removed from the power of the central union.

PROPORTION OF LACE WORKERS.

In Nottingham the proportion of females is higher than in the population of the country as a whole, there being 114.6 to 100 males, while the population of England and Wales, as a whole, shows 106.7 females to 100 males. The large number of women employed in the lace and hosiery trades probably attracts women from the other towns, for the larger proportion of the female population are workers. The census of 1901, for instance, showed that of 27,819 females in Nottingham between 15 and 25 there were 21,566 engaged in some occupation, 7,942 being in the lace and hosiery trades alone. The percentage of wives and widows working was 24.1 per cent, which is an unusually large proportion.

Of the total population of the town in 1901 there were 14,701 women and 6,925 men returned as engaged in lace manufacturing, but this did not include many engaged in allied trades, such as dyeing, etc., which do work for both the lace and outside trades.

At least two-thirds of the workers in lace factories in Nottingham are women, whereas in Calais it is estimated that less than one-half are women. In both cases the twist hands are always men, which is partly due to the fact that in normal times the factories work night and day, and in both countries women are forbidden to work at night.

Both at Calais and at Nottingham there is a large industry carried on at home in cutting apart the lace, clipping off floating threads, etc., but this is much smaller at Nottingham than at Calais. The Nottingham work is more factory work, for most of the net and curtains made need little or none of this work, and even on the fancy lace the manufacturers are not able to find the same class as the skillful French home workers to which to trust the material, and hence do much of it in the factory.

The lace factories of Nottingham are now running short time, owing to the financial state of the world, but in ordinary times they run 20 hours a day, as do the French. In France, however, the two shifts seem ordinarily to work alternatively four and six hours and six and four hours, while the two English shifts work alternately five hours regularly, but there is no uniformity about this, and some work one method and some the other. In both countries the factories in normal times run one hundred and twenty hours a week, starting at 4 a. m. and stopping at midnight, though in very flush times some work twenty-four hours a day.

COMPARISON OF CONDITIONS.

To compare the actual condition of the Nottingham lace workers with the Calais lace workers is rather difficult, owing to the fact that the two bodies of workers live differently and their requirements are different. In normal times there are fewer unemployed at Calais than at Nottingham, and the operatives seem to enjoy life just as much, but if they be compared on the same scale of living the English operative is much better off. In general it seems to be correct to say that the Nottingham workers get nearly a fifth more wages than the Calais workers, while their food and clothes of the same quality will be found cheaper at Nottingham than at Calais. The English operatives indulge in meat frequently, the French very rarely. Highly skilled twist hands, "tullistes" they are called at Calais, will get fully as high wages at Calais as at Nottingham, while very skilled designers seem to get even better wages, which is evidenced by the fact that some of the best designers at Calais are English, but on the whole the workers do not have as large a margin between wages and the necessary costs of living at Calais as at Nottingham.

In regard to wages, taking the two extremes, the twist hands and the bobbin fillers, we find that the ordinary first-class French twist hand operating a Levers lace machine will make about 50 francs (\$9.65) a week and the similar English twist hand about 50 shillings (\$12.16). The French boy for running the threads into the bobbins is paid 50 centimes (9.65 cents) a thousand and the English boy 6½d. (13 cents) a thousand. These two examples seem to show the difference in level of the wages though in certain of the subordinate occupations there does not seem to be much difference.

COST OF LIVING.

In regard to cost of food stuffs the following is a list of articles that I personally priced in the two towns at stores patronized by the operatives, both being given in cents per pound.

Articles.	Calais.	Nottingham.	Articles.	Calais.	Nottingham.
Bread.....	3.25	2.50	Sugar.....	8.14	5.00
Beef.....	17.50	10.00	Cheese.....	12.30	10.00
Pork.....	17.50	15.00	Butter.....	24.00	27.00
Flour.....	4.40	2.80	Milk, per quart.....	5.50	8.00
Potatoes.....	1.75	.80			

It is seen that in most instances the Nottingham operative has the advantage of cheaper food, and with his smaller wages the Calais operative is compelled to offset this by eating less of meat and more of vegetables. Beef, etc., is sold in France by the kilo and in England by the pound. Bread is sold in England by the 4-pound loaf and at Nottingham a loaf costs 4½ to 5½d. with average about 5d. (10 cents). In Dundee, where food costs higher than in any other industrial town in Great Britain, similar loaves cost 6d. (12 cents). Potatoes, flour, etc., are sold in Nottingham by the half-stone of 7 pounds. The French operative pays the high price of 4 francs a kilo (35 cents a pound) for coffee, and the English operative pays 36 centimes a pound for tea. The kerosene oil used at Calais costs 30 centimes a liter (5.8 cents a quart), while the paraffine oil largely used at Nottingham costs 16 cents a quart. Coal is cheaper in Nottingham than in most parts of England, selling by the hundredweight at 8½d. to 10d. (17 to 20 cents), while in Calais the retail price is over twice as high.

HOUSING OF OPERATIVES.

In regard to housing conditions at Nottingham they are on the whole very good. The poorer-paid operatives, especially those who live near the older and more crowded sections of the town, are very crowded and in unsanitary quarters, but the twist hands, especially those who live in the newer suburbs, have very pleasant homes. It may be noted that the English textile operative refuses to live in flats, such as are universal in Saxony and in many other parts of the continent, but always wants a home with a front door of his own. (To anyone who has ever been in England it is unnecessary to mention that buildings are always of brick or stone, for a frame dwelling anywhere in England is almost a curiosity.) Dundee is one of the few textile towns of Great Britain where the tenement-house system flourishes.

At Nottingham the old type of houses are three-room "back to back" and five-room "through" houses. The old back-to-back houses have no rear entrance, and the front door usually opens into the kitchen or living room, whence a stairway leads to the rooms on the upper floor, there being three stories in all. The "through" houses have a back entrance. The "back-to-back" type of house is common in the older parts of the city, and is usually unsanitary and inconveniently arranged.

The newer types of houses for workers at Nottingham, especially those in the newer sections of the towns and the suburbs, are always built in what is called the "terrace" style. Instead of blocks with houses facing the street from all four sides of the square there are



FIG. 7.—Typical Nottingham lace mill, with rear view of 5-room dwellings used by lace makers.

rows of houses rising in terraces one above the other. Usually there is a paved alleyway between each two rows with streets on each side of the two rows. These rows of houses usually have no front



FIG. 8.—A typical "terrace" row of houses as occupied by Nottingham lace makers.

yard, but at the back there is usually a fair sized space, which is sometimes divided off for each house and sometimes used in common. Figure 8 shows the front of a typical row of a "terrace," this picture being taken of houses occupied by "twist hands" working in a

neighboring lace mill. In some cases there is now left a 10-foot space in front of the houses for a front yard, and in such cases they are often filled with flowers by the wives of the lace makers.

These newer types of houses are either three, four, or five room. Figure 8 shows the four-room type built in two stories with narrow front containing a parlor or living room and a kitchen on the first floor and two bedrooms upstairs. A small scullery is sometimes but not invariably built out from the kitchen. Figure 7, which gives a view of a typical Nottingham lace factory, also shows a rear view of the typical five-room "terraced" houses. These are becoming the predominant type of the new dwellings, and are made with parlor and kitchen on the first floor, two bedrooms on the second, and an attic above. Here again the front door opens directly into the parlor, and there is usually a small scullery behind the kitchen and a small inclosed back yard.

Six-room houses are rarely occupied by workers except such higher paid men as foremen and clerks. Detached houses are extremely rare as the houses are all built end to end in terraces.

RENTS AND TAXATION.

The predominant range of weekly rents for the different size houses are as follows:

Number of rooms.	Rents.
Three rooms.....	\$0.85 to \$1.15
Four rooms.....	1.10 to 1.28
Five rooms.....	1.22 to 1.70
Six rooms.....	1.58 to 2.30

It is seen that the average rent per room per week is about 35 cents. As a rule, the operatives are not very crowded.

At Nottingham the town owns much property, and the rent from these are used to reduce the rates of taxation. The town also owns most of its public utilities, such as the water supply, drainage works, gas and electric supply, baths, cemeteries, extensive markets, hospitals, a lunatic asylum, etc., and has many parks and breathing spaces. In sewerage works the town is very deficient, as these have been extended to but a small portion of the incorporated limits, and this fact is stated by a recent report of the medical authorities to be one of the main causes of much of the sickness. The use of gas is extending, and is now installed in most of the newer type of workmens' dwellings. An automatic "penny-in-the-slot" meter is used in such cases.

LABOR UNIONS.

The higher-paid workers in the Nottingham lace factories—such as the twist hands or "lace makers"—are very strongly organized, and as the independence and jealousy of the manufacturers prevent their having any similar alliance except temporarily, the unions usually dominate the situation.

The secretary of the "Amalgamated Society of Operative Lace-makers" states that there are 2,000 twist hands in the Levers branch

in his union and 550 twist hands of the plain net branch, with smaller numbers engaged in the curtain branch, and that 99 per cent of the twist hands of Nottingham belong to this organization. The poorer paid workers, consisting largely of women, are not so strongly organized. This union belongs to the International Federation of Lace Makers, and is the wealthiest branch, but, owing to some differences at a meeting this year at Calais, they have temporarily withdrawn. The income of this union, including their branches at Beeston, Ilkeston, Long Eaton, Draycott, and Sandiacre, for the half year ending June 30, 1905, amounted to £6,668-12 (\$32,452), and their surplus cash in bank at this time was given as £10,071 (\$49,010). This union pays its superannuated members, of which there is now 180 on the list, 85 cents each a week, and they also pay either in whole or in part, in special cases, for sending their members to sanatoriums, convalescent homes, etc., for dispensary charges, etc., and also allow out-of-work pay. Just at the present time, owing to the depressed condition of the trade, this latter amounts to a large sum.

CONSULAR REPORT.

HOME WORK IN THE NOTTINGHAM LACE INDUSTRY.

Consul Frank W. Mahin, of Nottingham, sends the following report on the investigation by the British Government into the question of home work in the lace industry:

An inquiry by Parliament into home work—i. e., work on articles taken home from factories, etc., by women and done by them and their children at home—has recently been held, with a view to a possible law to better the condition of the workers and to correct abuses. Much evidence was given by expert witnesses. The lace industry was one of the subjects investigated. According to the evidence, 7,700 home workers in Nottingham are engaged on laces—clipping, scalloping, and drawing out superfluous threads. The work reaches them through middle women, who receive a commission of about 25 per cent of the compensation allowed by the manufacturers for the work, for taking the laces to and returning them from the home workers. These middle women are considered a necessity, as they save time to both workers and employers, and are responsible for the selection of competent workers in wholesome surroundings, and for damage to goods and poor service. They are sometimes charged with retaining extortionate commissions, but this is apparently not well founded.

The home work evidently induces household and personal cleanliness, which is usually a condition precedent to receiving work. Charges of sweating are denied by the manufacturers, though undeniably the wages paid the workers are small. They earn from 2 to 8 cents an hour, varying with the class of lace and the rapidity of the worker. Some workers make their living from this employment, but it seems that the most expert can not earn more than \$4 a week. The majority, however, are women who work in spare moments, assisted by their children before and after school hours. In many cases these women have husbands earning in other ways enough to

support the family, when the women's earnings are only supplementary. This is one cause of the low wages paid for the home work. A serious objection made to home work is that it detracts from the diligence of some husbands.

Allegations of excessive use of child labor in home work are often made, but these are denied by the manufacturers and by investigators. It is admitted that child labor is employed to an unusual extent in Nottingham, but this is due to the character of the work, which a child can do easily.

An important question considered by the parliamentary committee was whether or not it would promote cleanliness and prevent abuses if a government license for home work were required, necessarily preceded by approval of the proposed licensee. Expert evidence generally was to the effect that it would be impracticable, prove needlessly restrictive and burdensome, and be detrimental to home workers, as employers would tire of the continual inspections and cease giving out work. Workers themselves take a similar view, evidently believing they would fare better, on the whole, without government intervention.

Local newspapers have interviewed manufacturers, middle women, and home workers. Discordant opinions were given. But a broad general view of the subject appears to induce the belief that home work, as conducted at Nottingham in the lace trade, is to the interest of both employer and employed, and that it would be hurt more than helped by government intervention.

LACE MAKING AT CALAIS

DEVELOPMENT OF LACE MAKING.

EARLY BECAME CENTERED AT CALAIS—GREATLY AIDED BY THE
JACQUARD ATTACHMENT.

In the production of fancy laces Calais leads the world, and great fortunes have been made here in manufacturing lace for the American trade. Started in 1816 it has especially prospered in the last ten years, and men who were working as machinists or "tullistes" five or ten years ago now own plants worth millions of francs. The trade is steadily increasing, which means that the United States is buying increased quantities, as three-fourths of the Calais export is taken by this one country.

Lace is made at Calais, Caudry, St. Quentin, Lyon, Lille, and St. Chamond, but Calais and Caudry are the two main centers, both in the Department of Pas-de-Calais.

The official figures for the export of cotton manufactures from France in 1907 showed 1,872,739 pounds of machine-made lace, of a value of \$12,604,830, or \$6.73 a pound. There is also shown \$2,873,384 of tulle and \$578,614 worth of tulle curtains of cotton, besides \$4,849,511 of silk laces. These are the figures for the direct export, and do not include the large amount of laces of all kinds sent to the shops and dressmakers of Paris, which eventually reach the United States without being recorded by the customs. The total export of articles made on the lace machines of France may be conservatively estimated at \$25,000,000 a year. A French inspector estimates the lace production of Calais district alone at between 100,000,000 and 120,000,000 francs in good years. The bulk of the lace that is left after the United States has finished her buying goes to Great Britain and Germany, with smaller amounts to every other section of the globe.

HISTORY OF THE INDUSTRY.

This important industry of lace making dates from 1816, when it was smuggled over from England. Before that time there was no machine-made lace of French manufacture. The French had many single-loop net machines—based on the principle of the stocking frame—and to encourage its manufacture Napoleon, in 1802, prohibited the importation of the competing English articles. This made machine net and hand-made lace high priced, and in the meantime the English had invented a machine to make bobbinet that was a great improvement on all existing machines. It became clear to both English and French that the first factory to start such machines in France would make big profits, but the English manufacturers wanted no competitor. They desired to preserve the monopoly of the machines and machine-made articles that they had developed, and long existing acts of Parliament had prohibited the

export of machinery of various kinds. That of William III, of 1695, fined exporters of knitting machines £200 and punished them with twelve months' imprisonment, and this was extended in 1718 to all other kinds of machinery used in the manufacture of silk, cotton, and linen manufactures, adding a penalty of £500 on persons inducing artificers to leave the Kingdom. These acts were confirmed during the next sixty-six years, and in 1785 further extended to include engines, tools, and utensils used in constructing machines, and anyone exporting such machinery was further punished with deportation.

After the Napoleonic wars these laws were relaxed so that machinery could be exported on special permit, and in 1825 that part which prohibited emigration of skilled workers was repealed, but it was as late as 1841 before the laws forbidding machinery exportation were finally annulled. In 1816 the first lace machines were smuggled into France by dismantling the separate parts and mixing with a lot of old iron, and workers were also smuggled across the Channel. Cutts, at Douai, and James Clark, at Calais, both claim the credit of starting the first lace machine in France.

PRESENT LOCATION AND IMPORTANCE.

The industry gradually prospered and became centered at the town of Calais, but in 1832 the citizens objected so strongly to having their rest at night broken by the clack of the machines that the municipality forbade night work, and the factories gradually drifted to the suburb of St. Pierre-de-Calais, where it has remained ever since, though later developing large subcenters at Caudry and elsewhere. The French at that time made no high-grade yarn, and this was smuggled in from England in spite of the laws. In 1834 the prohibition against importing English cottons was raised, but the customs were strengthened and a high duty imposed, so that the result was to paralyze the industry.

About this time came the application of the Jacquard to the lace machine, which aided the industry by raising the price of the article and extending its range, so that after a period of depression lace making recovered and has steadily increased ever since. In 1850 the industry was almost wholly at St. Pierre and comprised 428 machines. In 1870 there were 939, and in 1908 there are now in and around Calais 2,615.

SOME GRIEVANCES OF THE MANUFACTURERS.

In 1892 France passed a new tariff raising the duty on cotton yarn. This was bitterly opposed by the Calais manufacturers, as they wanted yarn free, and stated that if they could get the superior English yarn free of duty they could also stand all competition due to lace coming in free of duty. Nottingham and Calais manufacturers have always consistently fought for free exchange of commodities required in their business. The law was made in the interests of the yarn mills at Lille and Tourcoing, and since then these mills have been able to extend their range of numbers until they make a good portion of the fine yarns required, though much is still obtained from England.

To aid the Calais manufacturers in meeting the increased cost of their materials, the French Chamber granted a special rebate of the duty supposedly paid on yarn contained in the laces exported, and in some cases the waste and cutting was also counted for 25 per cent. This was intended to aid the manufacturers, but they claim never to have received any benefit from it, as it is the buyers and commission houses who obtain the drawback, and in fact some of the buying houses pay the expenses of keeping up branch establishments at Calais out of the rebates thus granted on materials exported.

The Calais manufacturers also strongly opposed the proposed law restricting the hours of work of women and children to ten and forbidding them night work. The result, however, has been to benefit the trade in some particulars since its passage in 1892, for as tulle and lace machines run night and day with shifts, it practically confined the actual machine running to men over 18, and the boys were thus forced to work an apprenticeship in other lines of the work before taking charge of a machine, which made them when they finally graduated into work as full-fledged "tullistes" much more efficient. This restriction and the high duty are still held as burning grievances by many of the manufacturers.

GROWTH OF INDUSTRY.

The rapid progress of the Calais industry in recent years, as shown by figures furnished by the manufacturers' association, is as follows:

Description.	1905.	1906.	1907.	1908.
Manufacturers.....	365	365	500	584
Machines.....	1,867	2,227	2,367	2,615

The number of tullistes at Calais is now given as 7,700, and the total of factory workers of all kinds as 31,600, but this does not include the outside workers engaged in clipping, etc., which it is estimated would swell the total to two or three times this number.

The Calais lace industry pays its skilled labor higher than do most other industries in France and so obtains the best. The employers who are themselves in large part old workmen from all branches of the profession, are inventive and shrewd. Since the inception of the industry in 1816 the Calais manufacturers have rivaled Nottingham in the number of their inventions and adaptations, and, in fact, while the bobbinet machine is an English invention, the lace machine is a French invention, for it was only by the ingenious combination of the Jacquard with the bobbinet machine in France in 1834 that there was enabled to be produced the present machine-made imitations of genuine hand lace.

The superior taste of the French and their adaptiveness has developed the fancy lace side of the industry until now they surpass Nottingham, which has developed on their side more of the less artistic net and lace curtain part of the industry. Calais makes mainly narrow laces for the ornamentation of the costumes, coiffures, and clothing of the feminine sex, their perfection being most marked in such specialties as Valenciennes, Malines, and Chantilly. Large quantities of this lace is sold to the great stores and dressmakers of Paris, but the bulk is sold to commission houses, to whom the manufacturers

give varying rates of discount. There are usually three or four discounts, and among the buyers the talk is always as to who is getting the most discounts.

SKILLED LABOR COMMANDS HIGH PAY.

The French tullistes are a skilled set of workmen and they have energy and perseverance, are economical, and usually contented. They are independent, however, and hard to manage by one not accustomed to their ways of looking at things. They live well and a sight of the streets on Sunday afternoons show that they and their families can dress well. The French worker takes his family with him everywhere and they share their pleasures together. The workers at Calais, due to the higher wages paid the skilled classes, have more social enjoyments than usual among the working classes; they have numerous singing societies, bands, etc., and get up balls and fêtes. They also have fraternal and mutual benefit associations.

The designers, tullistes, machinists, and similar skilled men get good wages at Calais, but the less skilled workers have to be content with very little. Where a tulliste will make from 10 to 20 francs a day, the less skilled factory workers and the cutters will do well to get from 1 to 3 francs a day. Though the skilled classes live well, the poorer have to be very economical and to live on little meat, for Calais is one of the highest-priced food centers of Europe.

At Calais the employers and employees are both strongly organized. There are three employers' organizations, namely, L'Association des Usiniers Louers de Force Motrice, founded in 1895; La Chambre Syndicale des Fabricants de Tulles et Dentelles, founded in 1883, and comprising the principal manufacturers; and L'Association des Fabricants de Tulles et Dentelles de Calais, founded in 1900 at the end of the great strike. The last-named association embraces most of the manufacturers and is the most important.

The manufacturers publish a "Bulletin Mensuel" of 8 pages, in which they give news of the trade at Calais, Caudry, Plauen, and Nottingham, and statements of the conditioning tests.

CONDITIONING HALLS—LABOR UNIONS.

The Chamber of Commerce at Calais maintains an official "Condition publique des soies, des laines et des cotons." The strength, weight, and length of fine cotton and silk yarns such as are used in the lace industry will vary according to the atmosphere, and to get best results they should be maintained and be manufactured at a normal temperature and contain their normal amount of moisture. Condition halls for this purpose were established at Turin in 1750, and later at Lyon, St. Etienne, St. Chamond, and finally at Calais, the latter being made an official work and placed in charge of the Chamber of Commerce by the French Government in 1886. The operations of the condition house consist in storing materials for the manufacturers at a fixed temperature so as to preserve them in best conditions of humidity, etc., testing for number, weight, twist, percentage moisture, etc. This public conditioning house is very useful to the trade.

On the side of the employees there are two main organizations: L'Emancipation, which has its headquarters at the Bourse du Travail,

founded in 1900 and having about 1,500 members; and L'Union Française des Ouvriers Tullistes, a syndicate independent of the Bourse, founded in 1888, and having about 1,700 members. This union is the most active and also conducts a cooperative agency with some success.

Exceptional high-class tullistes and designers at Calais get fully as much as they would at Nottingham, if not more, but in general it appears that the skilled workers at Calais average about one-fifth less than similar workers at Nottingham and the unskilled workers average much less—this in spite of the fact that food is higher priced at Calais than at Nottingham. Many of the Calais manufacturers are English or of English descent and of the higher class of workers, especially the designers, draftsmen, and quite a few of the tullistes have come from England.

VARIATIONS IN THE TRADE.

Just at present (August, 1908) the Calais industry is undergoing a period of stress due to the slackness of orders from their main customer—America—and all-night work has been stopped and even the day work has been much curtailed. During the last three or four years the Calais manufacturers have been doing a prosperous business, so that most of them are now in shape to withstand a little adversity. Fancy laces being a thing that depends entirely on the vagaries of fashion as to whether there shall be a dead loss or a tremendous profit, the manufacturers are now faced with the alternative of closing down or of running into speculation by filling their warehouses with stocks of high-priced articles, which at the turn of the market may make them either millionaires or paupers according as to how their designs take. Two or three at least of the larger houses are thus trying their luck, but the great majority are running as few machines as they possibly can without disorganizing their force and losing valuable workmen.

In spite of the huge profits in the lace industry in good years the fact that it is an industry in which there has to be continual changing to catch every passing whim of the popular fancy makes it difficult to transplant, for to conduct the business successfully takes men long skilled in the art of anticipating what the world of fashion will require in one of its main luxuries. Fancy lace making is, however, getting a good start in America, where curtain manufacturing is already firmly established, and in time the United States will certainly save for her own workers the millions that are now annually sent across the Atlantic.

Mr. Henon, one of the largest manufacturers of Calais, vouched for the fact that many of his tullistes were making hundreds of francs a week during the flush times, and that he has one man who at that time was making 2,000 francs a week. Now, 2,000 francs a week is \$1,544 a month, and it would seem that any industry that can afford to pay such wages to a machine runner—even to an exceptional man in an exceptional time—is one that can be successfully organized in the United States. The first cost of the American enterprise, of course, will be higher than the first cost of a similar French enterprise, part of which would be incurred for customs duty on lace machines imported. This expense, however, would be modified or entirely removed by building lace machines in the United States.

LACE MACHINE AND LACE FACTORY.

DIFFERENT TYPES OF MECHANISMS—SPECIALLY PLANNED MILL BUILDINGS ARE NEEDED.

The lace machine is one of the most complicated and delicately adjusted machines made and is ranked among the highest if not absolutely the highest triumph of the mechanical genius of man.

Lace machines may be classed under four heads, (1) the band circular or plain net machine, (2) the lace curtain machine, (3) the warp lace machine, and (4) the Levers machine. The latter includes the "Levers machine," properly so called, with lean bars, and the "Levers go through" without lean bars, the latter being a more recent improvement and one that enables the machine to be run faster and to give a larger production, except for very complicated work. The lace machines in use at Calais are mainly of the last type. The standard machines are considered to be those of John Jardine of Nottingham and Jules Quillet of Calais. The present price of the 172 inch, 12 point Quillet, is given as 33,000 francs (franc=19.3 cents).

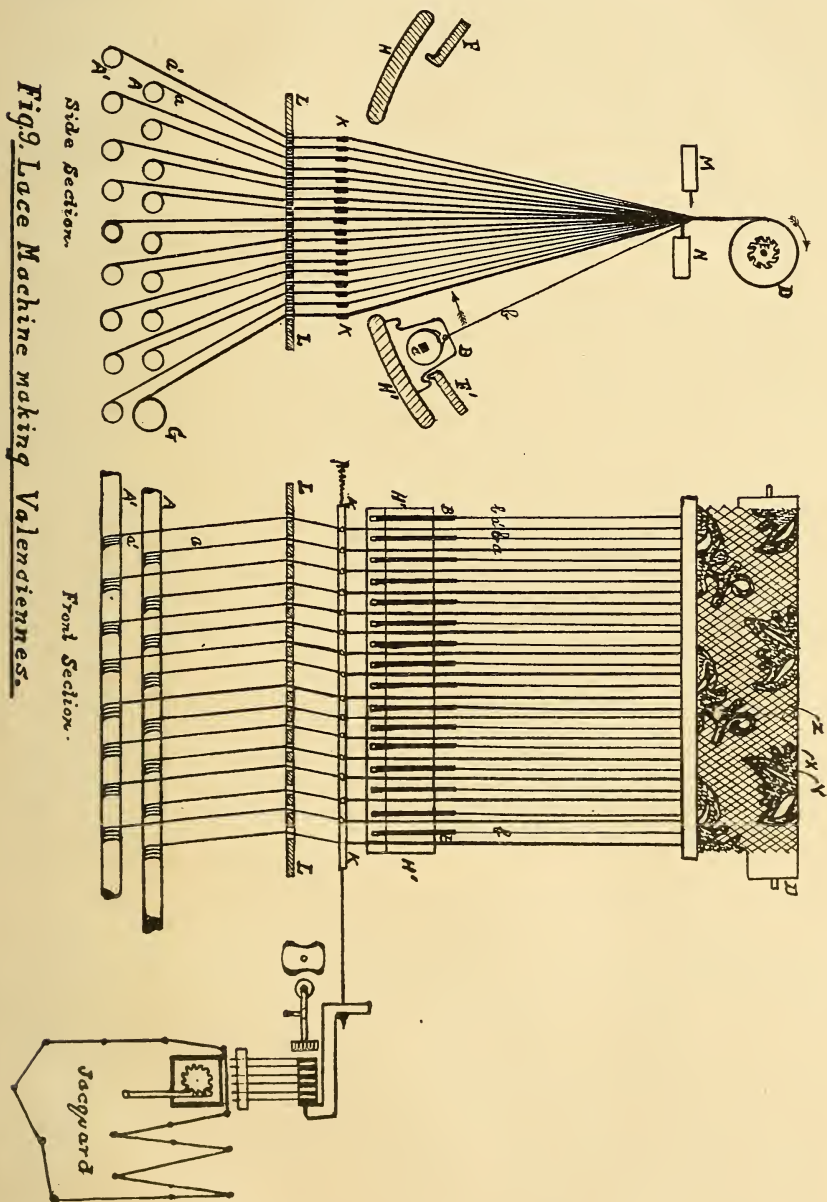
The lace machine is complex, but the basic principle underlying its operation is much simpler than it would appear to be on first sight. The weft threads are wound on round flat bobbins which are placed in thin steel shuttles or chariots and these swing back and forth through a vertical warp like the pendulums of clocks, each being guided by a groove. The vertical warp threads, which run up between the thin shuttles, are controlled by bars from a Jacquard and are pulled first to one side and then to the other of the straight-swinging shuttles and their crossings, which are made alternately around weft threads to their right and left with the warp threads on their right and left, and are pushed up into place by means of the needles of point bars. If the warp threads make their crossings alternately with those on their right and left it can be seen that there will be formed net work. To carry out this simple principle and to introduce variations much skillfully designed machinery is necessary.

NARROW LACE MAKING.

In figure 9 is given a front and side section of the ordinary lace machine as used to make the narrow Calais laces. In this sketch is shown sufficient details to give a correct idea of the method of operation.

The warp threads represented by *a* and *a'*, shown wound on small warp beams A and A' placed under the machine, pass up through the holes in a perforated guide board LL, through various pierced Jacquard bars represented by KK, and then up to the lace beam D on which the finished lace is taken up as made by means of an automatically operated ratchet wheel. The weft is shown passing from the bobbin *c* in the chariot B up to the point where the lace is formed by the twists made by the weft swinging back and forth through

the shifting mazes of the vertical warp. M and N represent the swinging rows of "points," one for each mesh in the length of the machine, that push up into place the meshes as formed. H and H'



represent the two long comb bars, one in front and one in rear, that are grooved to receive the thin steel chariots. In lace machines proper these are stationary, while in net machines they can be shifted to one side or the other as desired. The distance between the two

comb bars is usually only $1\frac{1}{2}$ inches, as it has to be such that the chariot enters the groove on one side before leaving that on the other but in the figure as sketched this space is drawn wider so as to better illustrate the arrangement of the warp. F and F' represent the swinging catch bars which alternately draw the chariot to the front or rear and then releases as the other catch bar takes hold to draw the chariot through the warp on its return trip. Large roller G carries the ground warp, the outline and guimp warp threads being carried by the small rollers A and A'. In the finished lace, as shown on the lace beam, the ground threads are represented by Z, the "brodeurs" or threads that outline the patterns are shown by X, and the guimp threads that are used to fill in the patterns so drawn are shown by Y.

OPERATION OF BARS.

It is seen that ordinarily in a piece of Calais lace there are four kinds of threads—the weft or bobbin threads, the ground warp threads, the outline threads, and the guimp threads. Each thread in each of the three warps has to be controlled by a separate pierced bar from the Jacquard unless in its work in the strip of lace it exactly duplicates the work of some other thread. For the ground warp using two threads to the mesh there will be a repeat every four threads so that there is needed only four bars. For some varieties there are used eight ground bars. According as there are two or four threads to the mesh there will be 7,200 or 14,400 ground threads for the 12 point, 150-inch machine. For the outline and guimp threads there is usually required a bar for each. To make tulle or to obtain particular ground effects the warp has to be passed through fine bars which are themselves placed in stump bars so that each system works independently of the other.

The Jacquard bars, shown at KK in figure 1, are crowded very close together and are made of very thin steel, there being sometimes over 100 to an inch. They are pierced at intervals for the passage of the thread. In a machine making 150 strips of lace at a time a guimp bar will have 150 holes, as the same thread will do the same work in each strip. The sketch shows something of the method of control by the Jacquard at the right-hand end of the machine, each bar being attached to the Jacquard at one end and to a spring at the other. The adaptation of the Jacquard thus used is known as the Martyn spring Jacquard, and usually there is employed a small Jacquard for the top bars and a separate double Jacquard for the bottom or ground bars. The droppers operate according to the design of the holes punched in the Jacquard cards, moving each pierced bar and its attached warp thread to the right or left as the design requires, but its action being similar to that of an ordinary loom Jacquard it is not necessary to amplify this. The ground threads are only moved a short distance and the outline threads themselves rarely go over ten gaits from their normal position, a "gait" being the distance between two parallel bobbin threads.

LARGE NUMBER OF THREADS.

In regard to the number of threads employed at one time on a lace machine this may vary considerably, but is usually between 12,000 and 30,000. In a strip of lace 12 centimeters wide being

made on a 12-point, 150-inch machine, the least number of threads that could be used would be: Bobbin threads 144, ground warp threads 288, outline threads 45, guimp threads 45, a total of 522 for each strip of lace. As there would be 30 bands (150 inches is 3.75 meters) there would be a total of 15,660 threads. Some complicated designs take up to 25,000 or 30,000 threads. In the foregoing design there would be needed 4 bars for the ground, 45 bars for the outline threads, and 45 for the guimp threads, or 94 bars altogether. The number of bars in very fancy designs will run as high as 250.

As shown in the front section of figure 1 the bobbins slide in grooves cut in the comb bars, the distance sideways from center to center of neighboring bobbins being known as a "gait." A "plomb de combs," as it is called in French, or set of combs, is the number of grooves and hence of bobbins in a space of 2 inches. This basis of measurement originally comes from the knitting machine, which was the progenitor of the lace machine. Lace machines are designated by "points," which now refer to the bobbins instead of the point bars, and by "point" is meant one-half the number of bobbins to the inch, or one-fourth the number of bobbins to the basic measurement of 2 inches. In a 12-point machine, therefore, there are 24 bobbins to the inch, or 48 bobbins to the "plomb de comb." In a 160-inch machine, 12 point, there will be 3,840 separate chariots with their bobbins swinging back and forth together in an unbroken line. Machines are usually made 9, 9½, 10, 12, 14, 15, or 16 point, but some run as coarse as 5 point and some as fine as 18 point. In the latter case there will be 36 shuttles in every inch of width of the machine, which may be 180 or more inches long, so it is seen that there has to be very nice adjustments, precision in form and finish of the gearing, and perfect solidity and rigidity of framework, so that the thousands of combs, points, guides, pierced guide bars, carriages and bobbins, etc., may work in exact harmony with each other and in obedience to the pattern laid on the Jacquard. The lace machine is also designated by gage which is the number of chariots contained in 2 inches. A lace machine of 12 points, therefore, has at the same time a gage of 48, the 16 point has a gage of 64, etc.

CONSTRUCTION OF BUILDINGS.

The Calais lace factories offer certain peculiarities worthy of note. Lace making being an art in which the operator requires perfect light, the factories are usually built around an open quadrangle in the middle. Good light and air is insured by large bays opening on both the outside and on the quadrangle.

The buildings are mostly four stories high and the lace machines are usually on the second and third floors, the first and fourth floors being used for the preparation rooms and the bureau. The rooms for repairing, folding, finishing, the sales room, storage and shipping room, bookkeeping office, etc., are collectively termed by the manufacturers the "bureau." The designing, drafting, and card-punching rooms are usually on the second floor, but separated from the machine rooms.

Access to the different floors is from the quadrangle by means of spiral iron staircases in turrets. These turrets communicate at each

floor with iron balconies on which open the doors of the different workrooms. There are usually no interior staircases and the isolation of the different workrooms is thus complete, which is not only a source of safety in case of fire, but also tends to confine the secret of the operations in each room to the particular workers there employed, and thus prevent details of new designs leaking out to be made use of by their rivals.

The engine and boiler rooms are in a separate structure placed in the center of the quadrangle. Rope driving is universal. Electric driving is as yet very rare and it is only recently that electric lighting has come into general use. Heating is by means of flanged steam pipes placed along the wall near the floor.

All the large manufacturers have their own buildings. In many other cases the owner of the building rents the premises to one or more manufacturers and sometimes contracts also to furnish power, heat, and light. In some of these large factory buildings there will be as many as a dozen small manufacturers each operating a few machines or else confining himself to some specialty, such as spooling and warping, etc. Small manufacturers find it cheaper to rent the required space in a large factory building where they can get their needs supplied close at hand than to put up separate smaller buildings of their own. The figures furnished me by the manufacturers association for March 1, 1908, showed 584 manufacturers for 2,615 machines. It is apparent that while some of these are engaged on special lines of manufacture there must be a large number of small manufacturers owning one to ten machines.

FOUR DEPARTMENTS—IMPORTANCE OF DESIGNING.

There are four divisions of the operation of the lace factory, (1) the designing, (2) the preparation of the materials, (3) the lace making, and (4) the finishing and cutting out.

The designing is the most important part of lace making, for without a good design lace is useless rubbish, as it will be unsalable. The designer is therefore the mainstay of the establishment and on him depends in large measure the success or failure of the firm. The designer usually gets the highest salary and is engaged by the year, and frequently is under contract for five years or more. The large factories have their own designers, while the smaller ones very often obtain their designs from outside professional designers. Public designers sell ordinary designs at the rate of 1 franc per centimeter of width, thus a design 10 centimeters in width sells for 10 francs, etc., though fancy designs bring fancy prices. The designer should be a practical worker, but this is not always the case, for his work being more artistic than mechanical designs are often sketched out that the factory is not able to fabricate at all or else not at a cost that will afford them a profit.

Sometimes a designer will work for a year on one design. The designers have to be continually on the alert to satisfy the fanciful demands of the mode. Sometimes very light articles are in favor and at other times coarse articles, sometimes one special style and sometimes another; hence the designer has to keep in touch with the market requirements in order not to load the shelves of his factory with unsalable articles. The great races at Longchamps and Auteuil in

the spring are the places where the designers get their first idea, from the costumes there worn by the Paris women, as to what is going to be the prevailing mode of the season. The designer forms his opinion and essays to create a new design along the lines of those in vogue or to make modifications of what he has seen.

MAKING DESIGNS.

The designer sketches the broad features of a design, floral, geometrical, or a combination of the two, but the smoothness of outline of such sketches can not always be reproduced, as the pattern will have to be displayed on a network of meshes. The sketch as made by the designer has to be transferred to cross-section paper by a draftsman and drawn to scale so that the width is proportioned to the number of chariots to be used and the length to the number of Jacquard cards employed. Briefly to illustrate: Suppose there is a sketch for a Valenciennes lace 12 centimeters wide and the sketch repeats every 7 centimeters, and it is decided to make it on a 12-point machine. A 12-point machine has 24 chariots to the inch, and as 12 centimeters is 4.72 inches this requires 112 chariots for each strip. In showing this on the cross-section paper there is usually employed one-fourth as many spaces as chariots, so for example a width of 28 squares will be taken. For the length of this foregoing design a rack of 1,920 motions will make 70 centimeters of lace; hence for the 7 centimeters of the repeat there will be required 192 motions. It is customary to use one-sixteenth as many vertical squares as there are motions, so there will be 12 vertical squares. The design will therefore be reproduced on paper showing 28 by 12, or 336 squares.

Sometimes the designer and the draftsman who puts the design on cross-section paper are one and the same, but it is preferable to have separate men to secure the best results. On the cross-section paper the draftsman shows in different colored ink the positions of all the threads and their interlacings, and this is a work that requires long years of study and an accurate knowledge of the capabilities of the machine. In complicated designs made with independent bars such representation is difficult, and often two or more sketches have to be shown to convey the idea accurately.

The design thus completed on cross-section paper is handed over to a woman called a "pointer," who traces the course of each thread and marks its position by means of numbers on similar cross-section paper. While this is not very skilled work, it requires great accuracy. These sheets with numbers go to the puncher, who sits at the piano puncher and punches the cards according to the figured position of the different warp threads as shown on the point paper before him, punching one card for each line of squares on the paper corresponding to one movement of the machine. The point paper marked with the figured position of the warp threads is usually called the "bareme." The cards after punching are laced together, sometimes by machine, but oftener at Calais by hand, and are then ready for use on the jacquard.

PREPARATION OF THE YARN.

Going from the designing department to the preparation departments, the yarn is usually bought in skeins, though sometimes on the cop and occasionally on cones. Part of the yarn comes from England and part from France, the latter mainly from the fine spinning mills of Lille. In ordering both the French and English numbers are usually given so as to prevent mistake. Thus if there was required 1,000 kilos (kilo=2.2 pounds) of two-ply No. 100 English there would be ordered "1,000 kilos of No. 100/85/2 cotton yarn," which would be clear, as the corresponding French number is always less than the English number.

In the preparation rooms will be found spoolers, warpers, wheelers, and perhaps twisters, cone winders, and gassing frames. The first operation is usually spooling. The weft threads are then run onto beams about 12 inches wide and 20 inches diameter. These beams then go to a machine usually called a "wheeler," the girl operating same is called in French a "wheelease." This machine is used for filling the thin bobbins with thread. The bobbins are slid on a square arbor, usually 60 to 80 at a time, and each separate thread guided into the groove of a bobbin. An indicator marks the length of yarn wound on, which varies according to the size of the bobbin and the fineness of the yarn, but usually about 35 meters, corresponding to, say, three strips of lace as made by movements measuring 80 to 100 racks. The wheelease is paid usually about 5 centimes per 100 bobbins filled, and will make from 2 to 5 francs a day, according to skill. Another machine using a square arbor is used to unwind from the bobbins as brought back from the machine the short lengths of thread that remain on them. These are unwound onto ordinary spindle bobbins, and a small boy operates 6 or 8 of such spindles, making 1.5 to 2.5 francs a day. The warp threads after spooling are creeled, and those to be used for the outline and guimp threads are wound directly onto small warp beams, which are about 1.5 inches diameter and in length either the half or the full length of the lace machine. As the ground warp is not so divided, but is on one beam which may have from 7,000 to 15,000 threads, this can not be run on from one creel, but creel after creel is run on side by side onto the swift of a large mill, and then all the warp threads thus run on are run off together onto the large warp beam, which then goes to the lace machine.

INSPECTION AND FINISHING.

After the lace is made it is inspected and repaired, bleached or dyed, starched, clipped, the strips cut apart, then again inspected and repaired, measured, folded, ticketed and put up for shipment.

The lace is inspected and repaired in the factory, but the bleaching, dyeing, and starching are carried out in separate establishments. After bleaching and starching the lace is put on the pins of a tentering machine, and as it moves forward through a drying chamber the sides holding the lace are moved back and forth in opposite directions so as to draw out the meshes to their full width. Instead of a tentering machine a stationary tenter is usually used for fine laces and the lace left stretched in a heated room with fans blowing over it until well dried.

The lace then goes back to the factory. The next process is clipping, which may be done in the factory, but is usually outside work. For articles in which the floats occur in regular straight lines the material is put on the table, and as it is drawn forward by rollers the operative holds a pronged clipping knife flat on the line of floats, which does the work very quickly. Usually, however, the nature of the design is such that the floats can only be removed by regular scissor work, and this is done in the homes in the country for miles around Calais.

The period of greatest activity in the lace industry usually occurs when the farm work is inactive; thus, while the remuneration received by those who clip the threads is very small, it is a welcome addition to their income during a dull period. There are a large number of men known as "entrepreneurs de decoupage," or clipping contractors, who take quantities of the lace and distribute it throughout the villages as far off as the Belgian frontier and the country beyond Boulogne. It is a common sight to see these contractors getting on and off the train at Calais with great bundles of lace on their backs. The manufacturer pays this contractor per thousand floats, which means per 2,000 scissor cuts. The average figure is about 8 centimes (100 centimes=1 franc=19.3 cents) per thousand clips, but as the contractor must make his profit the actual home worker gets much less. After the floating threads are clipped off the strips of lace are cut apart by cutting and drawing out the threads that bind them together.

The lace is then returned to the factory by the clipping contractor and is there inspected and again repaired. It is then folded into 12-yard (11-meter) lengths, ticketed, put up in packets, and these packed in large wooden boxes. There is much variety in the methods of arranging for market according to the different desires of their customers, sometimes the lace being wrapped on cardboard, sometimes on paper of various colors, sometimes on itself, and being wrapped around with gold and silver threads, with name bands, etc. The packets of Valenciennes are usually put up to contain three 12-yard strips, but there is no fixed rule as to the other varieties.

WAGES PAID IN CALAIS.

SCHEDULE OF PAY DRAWN UP THROUGH JOINT AGREEMENT—VARIATIONS ACCORDING TO BUSINESS CONDITIONS.

The worker who operates a lace machine at Calais making tulle or lace is called a "tulliste." He is paid per "rack," and by rack is meant 1,920 picks or motions made by the bobbin and its chariot through the lines of warp threads; that is, 960 motions from front to rear and 960 motions from rear to front. The price paid per rack varies according to the kind of lace being made, according to the gage of the machine, the width of the lace strips, etc., and is usually based on the tariff of wages made up in 1890 for the different articles.

In the early part of 1890 the factory owners held a meeting to put an end to ruinous competition among themselves due to undercutting of wages by some of their members. They drew up a complicated wage tariff that was to be adopted as the minimum below which no manufacturer was to go. The workers thought that an attempt was being made to lower their wages, and immediately struck, refusing to work under any wages tariff in which they had no voice. Their claim was finally allowed, and a committee of the "Association des Fabricants de Dentelles de Calais," jointly with a committee from the "l'Union Française des Ouvriers Tullistes," drew up a mutually satisfactory schedule. This was adopted for one year, and at the end of that time was repudiated by the manufacturers, but the workers' associations continued to agitate for its enforcement and boycotted those who attempted to pay less, until in 1896 it was again accepted by the employers. This tariff is not always adhered to, and in flush times like 1905, 1906, and part of 1907 the actual remuneration ran very much above the schedule, but prices have now dropped back to rock bottom, and as the employees resist any attempt to cut under the schedule this tariff is at present very generally observed in Calais.

The wage tariff as made in 1890 specified 21 articles, and the revision that was made in 1906 added 9 others, giving 30 articles which practically covers the range of work.

The standard on which the tariff is based is the lace machine of 144 to 154 inches and the "rack" of 1,920 motions. For every 10 inches or fraction of 10 inches that the machine is longer or shorter than the standard given there is added or subtracted 5 centimes from the standard prices. The schedule is for work in the gray, and for all classes there is added for black work the following additions: 10 centimes more for gages under 9 point, 15 centimes more for gages 9 to 12 point, and 20 centimes more for gages above 12 point. For triple-warp work there is added to the regular schedule the following for all classes: 10 centimes for gages 9 to 10 point, 15 centimes for gages 10 to 12 point, 20 centimes for gages 12 to 14 point, and 25 centimes for gages above 14 point. "Hauteur," as

given in the wage schedule, refers to the width of the lace strips. It is given not in centimeters, but in reseaux or meshes. "Rendement," as given in the schedules, refers to the length of lace woven by a rack of 1,920 motions. This length will vary according to the size of the mesh and the class of work being made, but for each article there is chosen a certain "rendement" or standard production, on which the price is based, and then for lengths longer or shorter there is added or subtracted 5 centimes for every 15 centimeters or fraction of 15 centimeters difference from the standard selected.

The first article given in the wage tariff of 1890 is Chantilly lace, and the tulliste is recompensed as follows in francs per rack:

ARTICLE I.—*Chantilly.*

Four bars, without fine bars, double warp. Standard: 144-154 inch machine; 1,920 motion rack.

Hauteur.	9 to 10 points, inclu- sive.	10 per cent more up to 11 points.	20 per cent more up to 12 points.	30 per cent more up to 13 points.	40 per cent more up to 14 points.	50 per cent more up to 15 points.
30.....	0.65	0.71	0.78	0.85	0.91	0.97
36.....	.70	.77	.84	.91	.98	1.05
48.....	.75	.82	.90	.97	1.05	1.12
64.....	.80	.88	.96	1.04	1.12	1.20
80.....	.85	.94	1.02	1.10	1.19	1.27
96.....	.90	.99	1.08	1.17	1.26	1.35
104.....	.95	1.05	1.14	1.24	1.33	1.42
112.....	1.00	1.10	1.20	1.30	1.40	1.50

Under 9 point subtract 10 per cent for every point of gage. Production (rendement) of 70 centimeters to the rack taken as the standard and 5 centimes added or subtracted for every 15 centimeters or fraction thereof more or less than the standard. Compensation for length of machine different from the standard, for black on the machine, or for triple warp, as previously given.

In the foregoing it is seen that the price increases 10 per cent for every point of gage. This is the case with the first nine articles, of which the prices paid for the 9 to 10 point gage and other gages given in the next table can be figured therefrom by adding 10 per cent for every additional point. Including the Chantilly above, this table is as follows:

Hauteur.	Chan- tilly: 4 bars without fine bars, double warp.	Chan- tilly: Fine bars, stump bars, and guimps.	Plume- tis or floss: 4 bars with- out fine bars.	Plume- tis or floss: Stump bars and fine bars.	Mat chains.	Mat bobbin.	Center guimps.	Center guimps with stump bars and fine bars.	Mate- lasses or guimps in front and rear.
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.
30.....	0.65	0.70	0.65	0.70	0.70	0.75	0.65	0.70	0.85
36.....	.70	.75	.70	.75	.75	.80	.70	.75	.90
48.....	.75	.85	.75	.85	.85	.90	.75	.85	.95
64.....	.80	.90	.80	.90	.90	.95	.80	.90	1.05
80.....	.85	1.00	.85	1.00	1.00	1.05	.85	1.00	1.15
96.....	.90	1.05	.90	1.10	1.05	1.10	.90	1.10	1.20
104.....	.95	1.10	.95	1.15	1.10	1.20	.95	1.15	1.25
112.....	1.00	1.15	1.00	1.20	1.15	1.20	1.00	1.20	1.25
120.....	1.05	1.20	1.05	1.25	1.20	1.25	1.05	1.25	1.35

For articles Nos. 1, 3, and 7 the standard production or "rendement" (called "quality" in Nottingham) is selected as 70 centimeters to the rack; for articles Nos. 2, 4, 5, 8, and 9 as 65 centimeters to the rack; and for article No. 6 as 50 centimeters to the rack, and 5 centimes is added for every 15 centimeters or fraction thereof that the production per rack exceeds the length taken as the standard for that particular article.

The tariff for other articles is as follows:

ARTICLE NO. 10.—*Laizes and laizes voilettes (veilings)*.

With or without borders, dots, and small figures: 4 bars without fine bars. Standard production per rack, 60 centimeters, the price being up to 16 bars.

Points.	FRANCS.	Points.	FRANCS.
9.....	0.40	13.....	0.67
10.....	.45	14.....	.75
10.5.....	.50	15.....	.82
11.....	.52	16.....	.90
12.....	.60		

Add 2.5 centimes more for each 5 bars or fraction of 5 bars above 16. For the same article with fine bars or with center guimps add 5 centimes more if under 11 points and 10 centimes if 11 points or above.

ARTICLE NO. 11.—*Blonde-mède-voilette*.

Veilings set up with 4 bars, double warp. Maximum, 60 bars in all widths from 10 to 20 centimeters. Standard production per rack, 60 centimeters, the price being up to 20 bars.

Points.	FRANCS.	Points.	FRANCS.
9.....	0.50	13.....	0.77
10.....	.55	14.....	.85
10.5.....	.60	15.....	.92
11.....	.62	16.....	1.00
12.....	.70		

Add 2.5 centimes more for each 5 bars or fraction of 5 bars from 20 bars up to the maximum of 60 bars. For the same article with fine bars or with center guimps, add 5 centimes more if under 11 points, and 10 centimes more if 11 points or above.

ARTICLE NO. 12.—*Chantilly*.

With independent bars, double warp. Standard production per rack, 65 centimeters.

Hauteur.	FRANCS.	Hauteur.	FRANCS.
13.....	0.75	14.....	0.80
14.....	.75	30.....	.85
20.....	.75		

ARTICLE NO. 13.—*Article bourdon.*

Heavy bobbin, double warp. Standard production, 50 centimeters per rack.

Hauteur.	Francs.	Hauteur.	Francs.
30.....	1.15	64.....	1.25
36.....	1.15	80.....	1.30
48.....	1.20	96.....	1.40

ARTICLE NO. 14.—*Large ground articles.*

Centimes.

Plain ground.....	40
Plain ground with spots or lozenges.....	50
Plain ground with larger designs.....	60

ARTICLE NO. 15.—*Silk articles, single warp.*

Four bars without fine bars. Standard production per rack, 85 centimeters.

Hauteur.	Centimes.	Hauteur.	Centimes.
24.....	50	48.....	60
30.....	55	64.....	65
36.....	60		

ARTICLE NO. 16.—*Woolens.*

With independent bars.

Hauteur.	9½ points.	9¾ points.	9¾ points.	10 points.
36.....	0.60	0.80	0.85	0.90
48.....	.65	.85	.90	.95
60.....	.70	.90	.95	1.00
72.....	.75	.95	1.00	1.05
96.....	.80	1.00	1.05	1.10

Standard production per rack taken as 100 centimeters and 5 centimes added for every 15 centimeters more than the standard.

ARTICLE NO. 17.—*Carres, filets, neuvilles, and points de Paris.*

With independent warp and bars.

Points.	Centimes.	Points.	Centimes.
9 to 10, inclusive.....	40	11 to 12, inclusive.....	50
10 to 11, inclusive.....	45	Above 12.....	55

ARTICLE NO. 18.—*Guipure, chuny, and similar.*

With independent bars. Standard in this case taken as double rack of 3,840 motions. The rate includes up to 80 bars for large rack.

Points.	Centimes.	Points.	Centimes.
9 to 10, inclusive.....	90	11 to 12, inclusive.....	110
10 to 11, inclusive.....	100	Above 12.....	120

ARTICLE No. 19.—*Valenciennes.*

Standard in this case taken as double rack of 3,840 motions.

Bars.	9 to 10 points.	10 to 11 points.	11 to 12 points.
Up to 40.....	0.80	0.85	0.90
From 40 to 60.....	.85	.90	.95
From 60 to 80.....	.90	.95	1.00
From 80 to 100.....	.95	1.00	1.05
From 100 to 120.....	1.00	1.05	1.10
From 120 to 140.....	1.05	1.10	1.15
From 140 to 160.....	1.10	1.15	1.20
From 160 to 180.....	1.15	1.20	1.25
From 180 to 200.....	1.20	1.25	1.30

Add 5 centimes more for each additional point of gage.

ARTICLE No. 20.—*Plain platts.*

With fine bars. Standard in this case taken as double rack of 3,840 motions. Rate per large rack.

Points.	Centimes.	Points.	Centimes.
Up to 9 $\frac{1}{2}$	80	12 to 13.....	110
9 $\frac{1}{2}$ to 11.....	90	13 to 14.....	120
11 to 12.....	100	14 to 15.....	130

Article No. 20 bis.—Platts with embroidery, add 5 centimes more per 10 bars or fraction of 10 bars.

ARTICLE No. 21.—*Cotton loop ground.*

Single warp. Regular standard of 1,920 motions to the rack. Up to 40 bars pay 50 centimes a rack and add 5 centimes for each 20 bars or fraction of 20 bars above 40 bars. Standard production per rack taken as 75 centimeters. For double warp add 5 centimes and for triple warp 10 centimes per rack.

CHANGING.

A day of changing is to be recompensed with 4 francs per ten hours. An entire week of changing will be paid for by 25 francs. There will be considered as changing: (1) Setting up the machine; (2) changing the material on a machine, even partially; (3) trying a new design that takes more than a day to get in full operation; (4) changing the article.

When the worker who makes the alterations gains 30 francs in the week, the changing price will not be paid him. For example: (1) when a worker has made three days of alteration work at 4 francs, which is 12 francs, and has also made 15 francs by the rack, which will be 27 francs total, that will be his week's salary; (2) when worker has made three days of alteration at 4 francs, or 12 francs, and has made 22 francs by the rack, or a total of 34 francs, his week's wages will be only the 30 francs.

All alterations which do not last a day will not be paid for unless the worker has not been furnished with machine work by the rack before the alteration work. All alterations which will be made by a worker on a machine other than his own, however, will be paid according to the amount that he would have earned on his own machine.

For working up a warp of less than 50-hank lengths, the worker will be paid additional: 10 centimes up to 10-point gage, 15 centimes for 10 to 12 point, and 20 centimes above 12-point gage.

GENERAL CONSIDERATIONS.

First, selvage bars; stump bars, etc., will not be counted as bars employed.

Second, as for the "volants et barbes" (embroidered places on the raised figures) they will be paid for as follows: 5 centimes more to the rack for simple work, 10 centimes

more to the rack for large threads and fine bar work, 15 centimes more to the rack for more complicated work, and 20 centimes per rack for the difficult work.

Third, for "laizes" (widths) fabricated with the same mounting as for the bands the price will be the same.

Fourth, cotton articles of which the mounting is the same as for silk articles (such as Alençon, Bretonnes, Bishop, etc.) will be paid for at the same rate as for the silk articles.

Fifth, for articles which do not appear in the present tariff the remuneration may be such as mutually agreed on by employers and employees.

Sixth, for articles using gold, silk, or other metal threads the additions to be made to the regular tariff shall be as mutually agreed on for each case.

Seventh, lighting, heating, and oiling shall be at the charge of the employer.

Eighth, the standard of length of the machine, 144 to 154 inches, shall be taken as the tariff basis for all articles.

Ninth, the week commences Monday morning at 8 o'clock and finishes Saturday evening at 6 o'clock.

Tenth, for the application of the present tariff and for the settlement of disputes there shall be a commission of six members, of which three shall be employers and three employees, these to be taken from their respective associations.

The foregoing tariff for 21 articles was agreed to in 1890 and is still in force. In 1906 there was added the following articles:

ARTICLE 22.—*Various articles with heavy border threads using gages under point 9.*

	Hauteur.	Up to 6 bars.	6 to 12 bars.	12 to 18 bars.	18 to 24 bars.
	72	0.95	1.00	1.05	1.10
	96	1.00	1.05	1.10	1.15
Mixed bourdon.....	120	1.05	1.10	1.15	1.20
	144	1.10	1.15	1.20	1.30
	72	1.05	1.10	1.15	1.20
	96	1.10	1.15	1.20	1.25
Plain bourdon and entre-deux.....	120	1.15	1.20	1.25	1.30
	144	1.20	1.25	1.30	1.35

Add 5 centimes more for each 6 bars or fraction of 6 bars of bourdon. The fine bars fix the width. Standard production taken as 1.20 meters per rack and 5 centimes are added for each 15 centimeters or fraction thereof up to 1.5 meters; over 1.5 meters add 10 centimes for each 15 centimeters or fraction thereof.

Add 5 centimes for each half point of gage above 5 point. Add 5 centimes for center guimps. For center guimps and triple warp add 5 centimes for gages up to 5 point, 7½ centimes for gages 5 to 6 point, and 10 centimes for gages 6 to 7 point.

ARTICLE 23.—*Veilings called armure.*

Standard production taken as 50 to 80 centimeters per rack. Plain gages:

Up to 8½ points.....	0.30
9 to 10 points.....	.35
10 to 11 points.....	.385
11 to 12 points.....	.42
12 to 13 points.....	.455
13 to 14 points.....	.39
14 to 15 points.....	.525

For reduced gages: Add 5 centimes for each half gage from 16 to 10 points, and same from 9 points under. For 3 chariots inside and 1 out pay as for plain gages. For 2 chariots in and 1 out, the same. For 1 chariot in and 3 out pay ½ gage. Standard production taken as 80 centimeters for reduced gages and 2.5 centimes added for each 30 centimeters; below 50 centimeters subtract 2.5 centimes for each 30 centimeters less.

"Mouches" with the warp: Mouches of 4 gaits or less add 2.5 centimes. Mouches of 6 gates add 2 centimes, of 8 gaits 2.5 centimes, more taken on the plain gage supplement for the mouches as for 2 and 3 gaits.

Bars: For 8 bars or fraction of 8 bars up to 16 bars working with the warp, 2 centimes more. Bars working with heavy thread, separating, or for selvage do not count as additional. For "friquettes" embroidered with independent bars, apply article 10 of the tariff.

Length of machine: Machines above or below the standard of 144/154 inches will be paid more or less in proportion to their length. For a reduction under 120 inches for $\frac{1}{4}$ the supplementary warp add 5 centimes, for $\frac{1}{2}$ warp add 10 centimes.

ARTICLE 24.—*Large ground.*

Additional: To add to article 14 the lozenges more than 2 centimeters in diameter pay 60 centimes. One-half warp supplementary 10 centimes more per half gage. Entire warp supplementary $\frac{1}{2}$ gage 10 centimes more.

ARTICLE 25.—*Imitation Valenciennes, double warp.*

For center guimps apply article 8. For guimps in center and rear apply article 9. Reductions: One-half warp 10 centimes less up to 10 points inclusive. Fifteen centimes less from 10 to 15 points.

ARTICLE 26.—*Heavy cotton bobbin, flat kind with coarse border thread.*

Apply article 6 of the tariff. The article 20 bis (platt with embroidery) say from 1 to 10 outline or border threads only to start from the hauteur 36.

ARTICLE 27.—*Mouches made with iron yarn.*

Friquettes laizes $\frac{1}{2}$ gage, with four rolls for $\frac{1}{4}$ warp, covering silk in gray, bleached, and black. These articles have no tariff but are by agreement.

ARTICLE 28.—*Cluny and similar.*

Coarse guipure, independent bars with or without repetition. Standard production taken as 50 centimeters; 55 centimes up to 60 bars; 5 centimes more for each fraction of 10 bars additional; 5 centimes more for each 10 centimeters more of production.

ARTICLE 29.—*Supplementary to article 29 of the tariff.*

The standard of production of the Valenciennes will be 40 centimeters per rack of 1,920 motions. Add 5 centimes for each fraction of 10 centimeters above the standard up to 80 centimeters; 10 centimeters more for each fraction of 10 centimeters above 80 centimeters.

ARTICLE 30.—*Torchon guipure with independent bars.*

Standard production taken as 60 centimeters, using 60 bars. For every 20 bars or fraction thereof additional add 5 centimes. For every 15 centimeters or fraction thereof of production additional add 5 centimes.

SUMMARY OF WAGES.

In the tariff the actual wages received by the tulliste works out as follows: Take a piece of 10-point Chantilly lace of 64-mesh width. The remuneration is 80 centimes a rack and the machine will get off about 240 racks a week working 20 hours a day with two shifts. This would be 192 francs to be divided between the two tullistes or about \$18.50 a week each. On a 10-point Valenciennes 100 to 120 bars the rack is remunerated for at one franc. There may be gotten off 300 racks on this, so there will be 300 racks to be divided between the tullistes, which would be \$29 to each for their week's work.

It is seen that on the latter the pay per rack is higher, and it happens in this particular case that it is an article on which more racks can be made on, but the work is more difficult and it requires a much more skillful tulliste, so that the remuneration depends on the skill of the worker, and only the best workers are given the finer and higher paying articles.

The foregoing examples are for a week of steady work with the article unchanged. Ordinarily there is much time lost by reason of setting up and changing designs and other causes, so that the ordi-

nary wages of a good tulliste will probably not average much over 50 francs or \$10 a week. In exceptional times on very fine work this average may run up into the hundreds of francs, and as previously noted, one tulliste employed by Mr. Henon has made the record earnings of 2,000 francs a week.

The tulliste is the best paid of the operatives with the exception of the designer and the manager. The bobbin and clippers are also paid by the piece, while the majority of the other hands are employed in lace work by the day or week and the office force by the month. The "wheelease," or girls who fill the bobbins, are paid usually 5 centimes a hundred bobbins.

As previously noted the clipping is usually taken by contractors who let it out to home workers. The contractor is paid 8 centimes per 1,000 floats cut which calls for 2,000 clips of the scissors and the home worker gets about 6 centimes out of this. Cutting and pulling out the threads that hold together the different strips of lace is paid for usually at the rate of one franc per 100 meters of lace. The home workers only make from 15 to 40 cents a day.

The wages received by the workers in an average Calais lace factory will average about as follows per week:

	Francs.	Dollars.
Designer (first class).....	100 to 300	19.30 to 57.90
Draftsman.....	75 to 200	14.50 to 38.50
Woman pointer.....	40 to 80	7.75 to 15.50
Card puncher.....	50	9.65
Card lacer.....	20	3.86
Warper on ground warps.....	50	9.65
Warper on small rolls for guimps, etc.....	30	5.79
Wheelease (bobbin filler).....	35	6.75
"Remonteur," setting up design on machine.....	20	3.86
Mender.....	25	4.83
Folding, ticketing, etc.....	18	3.47

